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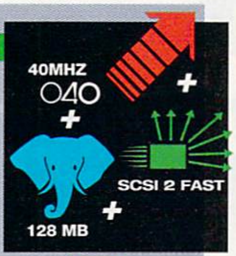
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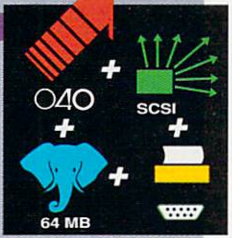
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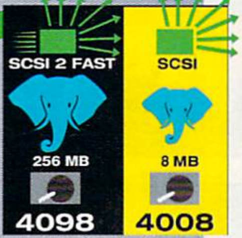


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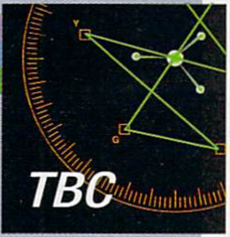
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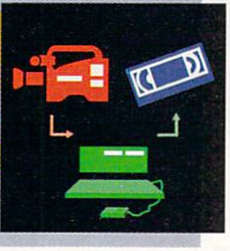
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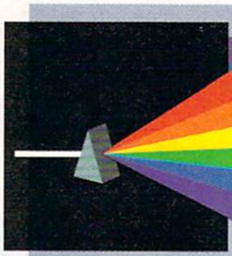
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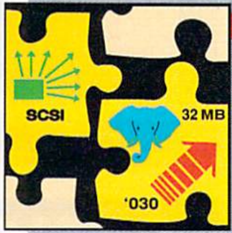
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CIRCLE **18** ON READER SERVICE CARD

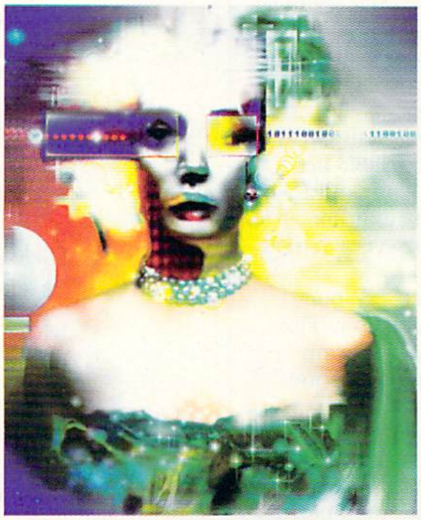
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CONTENTS

VOLUME 10, NUMBER 5, MAY 1994



"Colorful" is clearly the operative word for AW's May issue. The past year has seen a full-bore explosion both in high-color display devices and in inexpensive high-quality color printers. So check out our double-barreled feature coverage of the latest offerings in both markets, and cash in on the color-graphics revolution now!

FEATURES

ARTICLES

COLUMNS

DEPARTMENTS

REVIEWS

GAMES

COVER SPECIAL EFFECTS BY JACK HARRIS / VISUAL LOGIC
COVER PHOTOGRAPH OF RETINA Z3 BY EDWARD JUDICE

EDITOR'S DRAWER

The editor takes to his soapbox to address concerns of this month's letter writers in search of a kinder, gentler magazine.

SOMETHING FOR EVERYONE

"Faster, higher, stronger." That's the motto of the recently concluded Olympics, but it could also serve as the guiding principle behind the computer industry, which is constantly striving to upgrade products with more features to achieve better results. It's a commendable pursuit, which leads to more interesting, useful applications.

But, just as not everyone is capable of competing in an Olympic biathlon, not every user feels comfortable on computing's fast track.

The world of personal computing can be an intimidating experience for the first-time user, as several letters from this month's mail pouch suggest:

One letter writer from Susanville, CA, states, "Your magazine does not speak to the novice Amiga user. The articles are over my head. Most of the ads are over my head. I don't even know what they are trying to sell me."

Another reader complains, "Article writers always seem to assume the reader has a solid, basic knowledge of computers."

From time to time, *AmigaWorld* has had to refute the accusations that it is written only for professionals, particularly in the graphics and video arenas, where the Amiga really shines. Conversely, some of the more experienced readers claim that *AmigaWorld* is often too simplistic in its approach. So, while some in the Amiga community—probably the most technically sophisticated users in the industry—look for more technical coverage, others seek a more basic treatment of computer topics.

Maintaining the correct editorial balance is tricky. The magazine's focus is, and always has been, to help the novice, intermediate, and expert realize the promise of computing—that is, making their lives easier, more productive, and/or more enjoyable.

AW cuts across a number of lines to meet the needs of all users. A person who just wants to play games can use the same equipment as someone who handles the payroll for a major company. Computers fit right into the lifestyles of both the quiche-eating yuppie and the meat-and-potatoes practitioner.

As Commodore prepares to launch new CD32s and more A1200s into the market, there's an opportunity here to embrace a new generation of users . . . and *AW* will be there—constantly in search of the right editorial mix.

One returning serviceman (an *AmigaWorld* subscriber) writes regarding *AW's* editorial, "Don't change a thing. I like the broad coverage you provide. There is always something in it for everyone—diversity develops creativity—regardless of what we use Amigas for."

Welcome home and welcome to *AmigaWorld*, where the promise of computing still beckons to millions of people of varying abilities and interests.

Dennis Brisson

Dennis Brisson
Editor-in-Chief

AMIGA WORLD

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OVERSCAN

News, New Products and Networks

More Support for CD32

You're sure to see some interesting third-party peripherals for the CD32 this spring, and ***ParaVision*** (RS#120) is helping to lead the way.

The company's **SX1** ($199.95) internal expansion board adds a nine-pin serial port, a standard Amiga parallel port, floppy-drive and IDE hard-disk connections, an RGB video port, and a microphone jack.

It plugs into the CD32's rear expansion port and projects about two inches outward. It can also connect to the CD32's Full-Motion Video cartridge.

Included with the board is a parallel-port adapter that links the CD32 to other Amigas via a cable and the bundled ParNet software. Options such as an IBM AT-style keyboard translator, a memory interface to add 1, 2, 4, or 8 megabytes of fast RAM (up to 4MB on MPEG-equipped machines), and a microphone adapter will be available soon for an additional $20 each. Jerry Robinson, designer of the SX1, claims that the addition of RAM can more than double the speed of the CD32.

Team Effort

The SX1 was designed at MicroBotics, the Texas-based company that also produced the first expansion card for the A1200. MicroBotics was acquired by ParaVision in December for an undisclosed price, according to Robinson, president of the former company.

Robinson feels MicroBotics needed a buyer like ParaVision that could adequately support research and development for the high-end video market, including the CD32. He also states that CD32 is "probably one of the best products you could put on top of a TV to show the movies that are coming out on CD."

Robinson said that none of MicroBotics' dozen staff members were let go as a result of the purchase, and he added that response to the expansion board has already been encouraging. The entire output from the first three planned production runs has been pre-sold to European distributors.

On the Soft Side

Be on the lookout for growing software support for the CD32, as well. One such package, ***Almathera Systems'* Video Creator** (£39.95), adds graphics, animations, and special effects to music CDs. Watch out, MTV: With the Full-Motion Video cartridge, images and animations can be superimposed over existing video CDs. (RS# 121.)

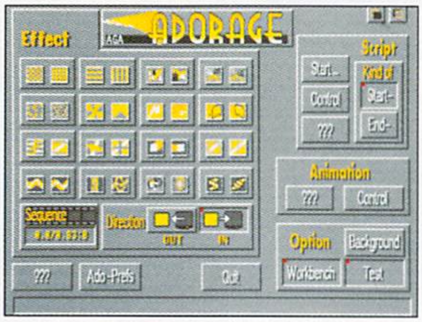
—*Peter Olafson*

Prismatic Products

Spectonics International (RS# 138) is living up to its name—it's offering a whole "spectrum" of products to add a bit of color to your Amiga's animation and image-processing capabilities.

With **PhotoworX** ($199) software and an XA-compatible CD-ROM drive, your Amiga's screen becomes a "contact sheet" of Kodak Photo-CD images. Simply double-click on a slide-like representation of the image and it will appear on your screen. You can apply some basic image-processing tools included with the package (such as detail-magnifying, cropping and scaling, color correction, and more) and then save the images as Amiga IFF files. It requires Workbench 2.04 or later and 2MB of RAM (a hard disk and accelerator are recommended).

ClariSSA 2.0 ($199) lets you create and play animations, and, as its name might suggest, it generates Super Smooth Animations (SSA) from existing ones (play back at 60 fields per second!). A variety of editing tools, a virtual-memory function to play large animations, and a built-in screen grabber round out the package's offerings. It supports AGA and ARexx.



2-D special effects are a snap with Adorage's icon-driven interface.

ClariSSA Professional 3.0 ($399) offers even more possibilities including a "multi-anim play" function, which can play back several animations simultaneously, totally independent of the resolution or palette of each. It also implements a "high-end" SSA format, which claims to be 80 percent faster than the standard format.

Adorage 2.0 ($199) generates 2-D special effects—from fade-in and fade-out to explosions. It features user-definable parameters and an icon-driven interface. Adorage supports AGA and HAM8 modes.

To the Point

With the **TruePoint CA-42** from ***MicroTouch***, programs are at your fingertips—literally.

The package consists of Commodore's 1942 monitor, a touch-screen adapter, a controller, and the AmigaTouch driver software. TruePoint promises to be a durable, plug-and-play solution for information kiosks, professional training programs, and so on. (RS# 136.)

To locate the vendors of products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 94.



More In Depth

Want to really dig in to specific areas of Amiga computing? Perhaps science and engineering, video, or games? New releases could make the digging easier.

Catch up on the latest developments for NewTek's Video Toaster with **The Atomic Toaster Catalog,** 3rd edition ($49.95, ***DevWare***) by Harold Russell. It claims to be "the ultimate reference manual for the Video Toaster," promising tips on all third-party products for Toaster systems. (RS# 123.)

Real 3D 2.0 users might gain insight with Avongard Products' 90-minute instructional videotapes. **Volume I: The Basics** ($49.95; distributed by ***Realsoft***) is a step-by-step guide to general modeling and animation techniques (including tutorials on Boolean operations and using the object hierarchy). Future tapes in the series will offer advice on cubic B-splines, particle animation, inverse kinematics, and more. (RS# 124.)

Attention would-be rocket scientists: There's now a newsletter devoted expressly to you. With your annual subscription to **Scientific Amigan** ($39; $49 outside the US) you will receive information on the latest Amiga products and applications for scientists, engineers, and educators every month. Additionally, you can choose two complimentary PD software or data disks from *Scientific Amigan's* extensive library. (RS# 125.)

After receiving letter upon letter from readers such as yourself, professional videographer and frequent *AmigaWorld* writer Geoffrey Williams decided to publish a newsletter himself. The quarterly, **Computer Artist and Videographer Report** ($80 per year, ***CBP***), offers candid business advice and reports on the latest trends in the video industry. In addition, each subscriber will receive a monthly disk that offers a more in-depth look at a specific graphics or video topic and includes relevant PD software. You will also receive **Intro Disk**, a catalog (on disk) of the various titles avaiable through CBP. **HyperMedia Journal**, a quarterly disk-based magazine offering articles, tutorials, rewiews, and more, is included with your subscription.

What about something for gamers, you ask? **Geoffrey Williams' History of Games** (***CBP***) is an interactive hypermedia "book" on disk. It covers everything from traditional board games to logic play to video arcades. You can even play one of 100 freely-distributable games as you learn about the game's origin. Currently, the book is available on floppy disk, but a CD-ROM version is in the works. (RS# 126.)

OVERHEARD

Now's your chance to hit the "big time." **Willow Mixed Media** (a non-profit arts organization) is seeking original Amiga-generated artwork for its video program "Amiga Artists on the Air" (distributed over local cable-access channels). You may submit work on disk (IFF or Toaster format) or on videotape (3/4-inch, Hi8, or VHS). Contact Tobe Carey, president of Willow Mixed Media, at PO Box 194, Glenford, NY, 12433, or call 914/657-2914 for more information.

Letter Perfect

Mailing List Manager ($79.95, ***Merlin's Software/Visual Inspirations***) options—mail merge, full sorting capabilities, and interlinking of external data files—are sure to inspire a chain (mail) reaction. The address database will organize your office's phone book for handy access to names and addresses, which you can output to labels and envelopes. And, with the help of DTP software, you can customize your output. You can even dial the phone from your screen! The program supports ARexx and requires AmigaDOS 2.0 or later. (RS# 135.)

OVERHEARD

Prime Image and ***NewTek*** have reached an agreement to make the former's **Passport 4000** Video-Toaster-compatible. The device will convert digital video signals to various international standards (including PAL, SECAM, PAL-M, PAL-N, and NTSC 4.43) using a new "pass-through" technology that does not degrade the signal. It also offers time-base correction/synchronization, and AT bus expansion slots for the A4000.

Feeling Blue

Good news for users wanting to run with Big Blue—there are two new PC-emulator cards for the Amiga 2000, 3000, and 4000.

The **Golden Gate 486SLC2** ($999) from ***GMR Productions*** (formerly Vortex Worldwide) claims twice the speed of its predecessor, the Golden Gate 386SX. The 50 MHz board includes 2.5MB of RAM (with 4 SIMM sockets to expand up to 16MB), an IDE interface, a floppy-disk controller kit, and a socket for an FPU. You can purchase the new Golden Gate along with GMR's **WinStorm** board (which offers Super VGA acceleration, SoundBlaster/Pro Audio Spectrum 16 compatible sound, a game port, and a SCSI CD-ROM controller) as a set for $1249. (RS# 132.)

The **486SLC2** 50 MHz Bridgeboard ($850, ***Elite MicroComputers***) with 3MB of RAM evolved from the Commodore A2386SX Bridgeboard. You can upgrade with an A2386SX trade-in for $550 and with an EMC 486SLC trade-in for $250. (RS# 133.)

16-Bit Harmony

Your A2000, 3000, or 4000 will be singing in unison with the **Toccata** 16-bit audio digitizer board ($599.95, ***MacroSystemUS***). The board offers three stereo inputs, one microphone input, and one stereo output.

It can record and playback up to 48 KHz in 16-bit directly to your hard disk. (With the ADPCM compression feature you can digitize at 32 KHz directly to a floppy disk, as well.) Using Toccata with MacroSystem's VLab video digitizer, you can digitize both sound and visuals for a video sequence.

Also included with the Toccata is SEKD's Samplitude editing software, which lets you exchange data between samples while viewing up to 10 samples simultaneously. It supports most sound files, including AIFF, MAUD, 8SVX, and more.

The Toccata is compatible with most CD players, DAT recorders, video recorders, and laserdisc players. It requires AmigaDOS 2.0 or later. (RS #134.)

Testing 1–2–3

You won't need any "bubble-sheet" testing forms or No. 2 pencils for **Mega-Test 2.0** ($29.95, ***DevWare***). With this software, you can create your own tests to measure your child's competencies right off the screen. Sound, graphics, or text files can be integrated into the test design to customize response feedback. After each question, a score is displayed to measure and reward progress. Sample tests are included. (RS# 137.)

GOOD, BETTER, AND BEST

A glance at this month's updates may suggest that good things (and good updates) really do come to those who wait. But, as another tried-and-true saying goes, "there's no time like the present" to take advantage of some special introductory offers.

A custom version (PAL only) of ***Great Valley Product's*** **IV24** video graphics board is available for the A4000. It claims to be twice as fast as previous versions when installed in an Amiga 4000 (performance will remain the same when used with an A3000 or 2000). Bundled with the board is ImageFX 1.5, which offers framegrabbing, video processing, painting, and rendering to tape. (RS# 127.)

Things keep getting better all the time at ***Black Belt Systems*** (RS# 128); check out the latest versions of **Imagemaster R/t** and **ApAssist**. Among other enhancements, the Imagemaster R/t 1.5 ($99.95) image-processing software offers some new area-selection tools, spline-based sequence controls, tablet-pressure functions, and ARexx commands, and sports a new morphing interface. The upgrade is $25 ($30 outside the US).

Imagine that you could "link" text files to each other so that you could click on a word in one document and call up its definition (including a picture file) in another—but without a stitch of programming! That's just what a program like ApAssist ($99.95) can do for you. Designed to replace AmigaGuide, it claims to outperform Commodore's hypertext solution yet occupy significantly less memory. New features include additional font tools, an enhanced user interface, and more authoring commands.

Next time your family screams, "Field trip!" take them to the planetarium—on your desktop. **Distant Suns 5.0** ($69.95) from ***Virtual Reality Labs*** lets you view the night sky as it was during historical times (and in future times, too!). Added features include AGA support, an icon-driven tool box of the most-used functions, sample stars from the Hubble Guide Star Catalog, new ARexx commands, and much more. It requires AmigaDOS 2.04 or later, 2MB RAM (1MB chip RAM), and a hard drive. You can upgrade from previous versions for $39.95. (RS# 129.)

Slow and steady may win the race, but who's got the time? For on-the-fly multimedia presentations, the latest release (#127) of Activa's **MediaPoint** (distributed by ***Creative Computers***) claims speedier Page and Script Editor functions, as well as some user-interface tweaks. The update is free to registered owners. (RS# 130.)

And who needs speedy performance more than programmers? **Devpac 3** ($109.95, ***Oregon Research***), an assembler/debugger package, promises to be at least 40 percent faster than its predecessor. You can even juggle your tasks within the new multi-window editor—call up any other program to change fonts, make backups, and the like. It is compatible with any 680x0 processor and supports math coprocessors. (RS# 131.) ■



ON-LINE SCAN

By Tim Walsh

Trick utilities, multifaceted applications, and wondrous games aren't the only great Amiga resources found on line. Less-glamorous yet still-beloved upgrades and bug fixes are worthy of some attention, too. Better known as "patches," these files are provided by both developers and well-intentioned souls.

A high-profile presence on the nets is a cost-effective method for manufacturers to reach both new and current customers. Users, too, benefit from a process of timely upgrades. And, knowing such freebies are available on line is all the motivation new users need to get onto the nets.

If you're doing some comparative shopping, check out the download totals of each product's most recent upgrade (and the frequency of its updates) before buying. For example, if you're choosing between a big-name paint program whose update gets hundreds of downloads, and a more basic and less-expensive package that doesn't, then the extra money might be worth it if you are concerned about long-term support.

UPGRADES GALORE

Instead of listing all of the upgrades and patches you can find on line, I limited this month's "scan" to a substantial list of recent (within the last 12 months) additions that you can add to your collection.

The leader of the patch pack is Utilities Unlimited's Mac-emulator, Emplant, with almost 20 different versions of the software appearing on GEnie alone. Since a new version of the software is released every few weeks, I dare say it's a necessity that all Emplant users have a modem and a GEnie account.

Users of Oxxi's SBase Professional, can find two upgrades on CompuServe. SB13EG.LZH in the Amiga Vendor forum will bring your SBase4 Pro 1.3e up to 1.3g, while SBP13B.LZH does the same for SBase4 Pro 1.3b.

Users of New Horizons' ProWrite should look on CompuServe for the file PWP331.LZH, which upgrades version 3.3 of the popular word processor to 3.3.1. If you've already upgraded ProWrite to that level, you will need PWP332.LZH on CompuServe, or GEnie file #19929, PROWRITE_PATCH2.32.LZH to upgrade to 3.3.2. Another New Horizons' product, Quarterback, has updates on the nets that bring it from 5.02 to 5.03 and from 5.03 to 5.04.

Nearly everyone who uses EA's DeluxePaint 4.5 AGA has stumbled on a few bugs over the past year or so since its release. You won't find a patch for this program on CompuServe, but you will on BIX and GEnie. Niggling problems are addressed and corrected with this patch, but just be sure to have your DPaint 4.5 program disks and registration card ready before launching into this upgrade.

Heifner Communications offers a fair share of upgrades for its Pegger program via the networks, too. Pegger1.2.LHA on BIX and GEnie has an interesting history. It began in the fall of '93 as the first major upgrade to the original Pegger. A second on-line upgrade brought the program up to version 1.3 and beefed-up support for Toaster Framestores. A third patch program was then released to fix a problem in the 1.3 patch. A patch to fix a patch, though rare, is not unheard of in these circles.

If you're interested in C programming on the Amiga, you're probably familiar with SAS's C/C++ 6.50 (see "Reviews," April '94, p. 63). Most networks offer a substantial (350K) upgrade that corrects some shortcomings and brings the package up to version 6.51.

Two late arrivals to the list of patch programs include PatchMath020, a small utility designed for older programs that allows them to take advantage of 32-bit memory for mathematical operations. On GEnie you'll also find SPAINT.LHA, which brings GVP's EGS-Spectra-Paint (the paint program that accompanies its EGS-Spectrum board) from 1.09 to 1.2.

BIX
800/695-4882
617/354-4137

CompuServe
614/457-0802
800/848-8199

Delphi
800/695-4005

GEnie
800/638-9636

Portal
408/973-9111 □

TWO for the price of ONE*

Buy one Timebase Corrector... ...and get a second one FREE!*

The Kitchen Sync is TWO complete S-Video compatible infinite window time base correctors on one IBM AT/Amiga compatible card. And at a price that you would normally pay for a single TBC.

Completely synchronize not one, but two independent video sources for use with virtually any switcher or digital video effects system requiring synchronous video inputs.

Two complete time base correctors on one card that can plug into any IBM AT compatible slot.

Check out these great features:

♦ Plugs into any IBM AT compatible or any Amiga A2000, A3000, or A4000 PC slot ♦ Plugs into Digital Creations new Video Slot Box ♦ Works with any video source, even consumer VCRs and camcorders ♦ Use multiple Kitchen Syncs, together for more channels ♦ Completely accurate sync generator built in: totally regenerates all sync and blanking signals; guaranteed accurate S/CH phase relationships ♦ Built-in proc amp ♦ Broadcast quality output ♦ Completely digital design ♦ Microprocessor controlled ♦ Easy to adjust external LCD control panel ♦ Advanced sync output ♦ Inputs are S-VHS and Hi-8 compatible. Use either composite or S-Video into either channel ♦ Great for use with the Video Toaster ♦ S-Video output option for full S-Video operation ♦ Control operation independent of Amiga, PC, or Toaster operation ♦ Easy installation ♦ No timing adjustments necessary for small stand-alone applications ♦ Genlock option available for house system integration ♦ Jitter-free freeze frame, field1 or field2 (channel independently selectable) ♦ Variable rate strobe ♦ External contact-closure interface for freeze ♦ Three user presets and one factory setting stored internally

The Kitchen Sync makes it easy to complete your desktop video installation. Everything you need is here.

♦ All on one card ♦ All at one great price



The Kitchen Sync

$1295.00

* At this price its like buying one TBC and getting the second one free.

♦ S-Video option $99.00
♦ Genlock Option $150.00

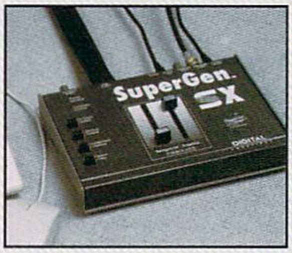
NEW!

Both composite and S-video in an external genlock

The SuperGen SX is our newest genlock and overlay system for Amiga computers. The "S" in "SX" stands for S-Video. The new SuperGen SX is a full featured S-Video genlock. The "X" stands for eXternal. The SX is an external device that attaches to any Amiga computer through the RGB port.

We have taken the best features of both the SuperGen and the SuperGen 2000s and combined them along with some great new features to make the ultimate new genlock for the new Amiga computers.

True broadcast quality video output ♦ True Y/C genlock and overlay ♦ Two independent dissolve controls ♦ Software controllable ♦ S-Video to composite or composite to S-video transcoding built in ♦ Interpretive dissolve mode ♦ Switchable 3.58MHz notch filter ♦ Switchable video input selection ♦ Switchable Genlock Disable for productivity mode uses ♦ One S-Video Input ♦ One S-Video Output ♦ One Composite Video Input



SuperGen SX

♦ One Composite Video Output ♦ Professional Key Out for use with switchers ♦ Switchable Chroma Notch filter ♦ Selectable blanking ♦ BNC and S-Video connectors ♦ Fast Sync Tip Clamp ♦ Key Output ♦ Internal RS-170A Blanking Generator ♦ Switchable Setup Adder ♦ Compatible with all Amiga models.

The new SuperGen SX external S-Video compatible genlock for the new series of Amigas has everything you want in a genlock and overlay system for your Amiga.

$749.00

NEW!

Break the single video slot barrier!

♦ Four Video Slots! ♦ Three PC/AT bus slots (power & ground only) ♦ 230W switching power supply ♦ Two 5.25" and two 3.5" drive bays

The Video Slot Box is a revolutionary new mini-tower that expands any Amiga A2000, A3000, or A4000 to have four complete video slots, three additional PC AT bus slots (Power and Ground only) for compatible cards such as our Kitchen Sync TBC, room for two 5.25 inch half height devices and two 3.5 inch devices (You can use this room for SCSI hard drives, optical drives, flopticals, tape drives, or anything else that fits.), and a beefy 230 watt switching power supply.

The Video Slot Box provides these solutions:
Use the Video Toaster with an Amiga A3000. Use more than one video slot product in your Amiga. Easily move your desktop video environment between Amigas.



Video Slot Box

The slots in the Video Slot Box are complete video slots with all the capabilities of the video slot within the Amiga. You can place up to four video slot products into the Video Slot Box. A front panel selector lets you choose which product is actually in control of the video slot within the Amiga.

With products that are "video slot masters" such as the Video Toaster or a genlock, only one of them can be active at a time. The video slot box allows you to easily switch instantly between several such products within one machine without having to ever swap boards.

♦ Coming Soon

To order direct call Digital Direct at 1-800-645-1164 (orders only please)

VISA MasterCard Free shipping on all VISA and MC orders in the US. COD - Cash only - add $10.00.

Call by 2:00pm California time for same day shipping. Technical information please dial 916-344-4825.

DIGITAL CREATION

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Circle 63 on Reader Service card.



The Reviews are in...

"The program is so fast and flexible that it makes its Amiga predecessors feel like the old Doodle! program on the Commodore 64. Nothing out there can match its feature set, and it's the one paint program I've used that's so fast that it never gets in the way of your creativity."
Amiga Computing, October 1993 (UK)

"Brilliance is now — leaving DPaint trailing in its wake — the best art package available for the Amiga. It's very hard to express why I'm so taken by Brilliance, there's just a feeling of 'rightness' about the way that it works."
C U Amiga, October 1993 (UK)

BLUE CHIP AWARD

ADU APPROVED

"Excellent! Brilliance is loaded with useful drawing and animation features, but it's not just the sheer number of tools on offer that impresses. Two other big points arise. First, the program is very easy to use, thanks to its intuitive, flexible and well thought-out panel system. The second major factor is Brilliance's speed. Even in HAM-8 mode, everything zips along beautifully quickly."
Amiga Format, October 1993 (UK)

"Brilliance is user friendly, doing an excellent job with nearly every function and option that it offers..."
AmigaWorld, December 1993 (USA)

"It is solid as a rock. Never have I known a first version of any program stand up like this or be so perfectly polished."
Amiga Shopper, December 1993 (UK)

"For many years, DPaint ruled the roost when it came to supplying incredible graphics power at an affordable price, but no longer. Brilliance has assumed centre stage and is now the Amiga's number one art package."
C U Amiga, January 1994 (UK)

"After using Brilliance for just a couple of days, I'm hooked. It is the only package to be released for the Amiga which can rival DeluxePaint for animation capabilities, and it is a class act."
Amiga Down Under Nov/Dec 1993 (New Zealand)

"It took a while, but Deluxe Paint IV has finally met its match. If you're looking for the best AGA paint program on the Amiga, look no further than Brilliance."
Amazing Computing, November 1993 (USA)

...Brilliance kicked Tut's Butt!

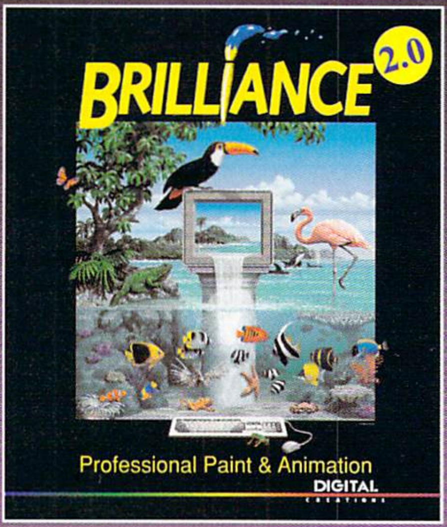


COMPARE!

Deluxe Paint IV *Vs.* Brilliance

	Deluxe Paint IV	Brilliance
Overall Speed	Slow	Fast
Picture Size Limited By:		
Chip RAM	Yes	No
Total RAM	N/A	Yes
Number of Brushes		29
Number of Anim Brushes	2	9
Number of Screens	2	Lots*
Levels of Undo	1	Lots*
Levels of Redo	1	Lots*
Load/Save Paths	Yes	Yes
Flip Frames	No	Yes
Realtime Preview Mode	No	Yes
Full Screen HAM Gradient Fill	Slow	Fast
Max # of Colors Gradient Fill	16	30,000
True 24 Bit Editing	No	Yes
Load DCTV Pics as HAM	No	Yes
Max Animation Speed	30fps	99fps
Ground-up Design for AGA	No	Yes

* Limited only by total RAM



ANNOUNCING VERSION 2.0

Version 2.0 of Brilliance has been designed with productivty in mind. Several new features enhance this already powerful program. Features like *Flip Frames* that allows the animator to flip through drawings. *Rub Thru* that make compositing easier. *Load and Save Tween paths* enabling much longer and repeatable brush moves. Faster and more accurate Tweening. *True View* option for magnification. And much, much more.

Brilliance! The best just got better!

Still Not Convinced?

30 Day Money Back Guarantee when purchased directly from Digital Creations as a Competitive Upgrade to Ver. 2.0. Call 800-645-1164 to order.

Circle 16 on Reader Service card.

DIGITAL CREATIONS

Digital Creations, PO Box 97, Folsom, CA 95763-0097
Product Information 916-344-4825 • FAX 916-635-0475 • Orders 800-645-1164

SuperGen SX

External composite and S-Video genlock.

Digital Creations, **$795**

All Amigas.
1.3/2.0/3.0 compatible.
Not copy protected.
Accelerator compatible.
Installation: **Easy.**
Minimum system: **2MB.**
Recommended system: **4MB, AGA Amiga, S-Video components.**

In 1990, Digital Creations updated its excellent SuperGen video genlock to answer the call for S-VHS and Hi8 compatibility. The result, the 2000S, was designed for the Amiga 2000's video slot, leaving Amigas that lacked a video slot (A500s, A600s, and A1200s) out in the cold. Now, however, Digital Creations offers a solution for all Amigas with its new SuperGen SX.

Quality Construction

The new SuperGen SX is a self-contained, steel-cased unit, with power supplied through the Amiga's RGB port using a cabled DB-23 male connector. A female DB-23 connector on the rear of the SX provides a pass-through for an RGB monitor. Other connectors include S-Video Input, S-Video Output, Composite Input, Composite Output, and Key Output. The unit also has a DIP switch for custom hardware configurations and a telco connector for an optional remote-control device.

Desktop control-panel buttons and controls are labeled Dissolve Fader Background, Dissolve Fader Graphics, Notch Filter, Interpretive Dissolve, Genlock Disable, and S-Video/Composite Video Toggle, with each button featuring an LED function indicator. Additional LEDs indicate Power/Genlock and Computer Control states. The buttons have a solid feel to them, and the fader bars glide smoothly.

I evaluated the SX in an S-VHS edit suite, using a waveform monitor and vectorscope for the final analysis. As software, I used Broadcast Titler for the A2000 system and MONTAGE 24 with the A4000.

Waveforming and Vectorscoping

After color bars were run through the SX, the vectorscope display revealed that both color saturation and chroma phase were precise. The waveform tests showed a luminance stairway step of equal size, and the top of the step was centered on the 100-IRE line. Sync tests showed a straight line at –40 IRE, coupled with a crisp and clean burst. The results were identical for both the A2000 and A4000.

For the A2000 test I launched Broadcast Titler and loaded in a CG page. I fed some prerecorded S-VHS videotape footage into the SX's S-VHS video input, with the text of the CG page superimposed over the incoming signal. The textual graphic overlay appeared clean, with a minimum of chroma crawl, twitter, or other NTSC artifacts. I performed an edit with the video signal and graphic overlay combined, and the resulting playback showed a clean and stable recording of both elements. Using the fader bars to bring the graphics in and out was a seamless operation. The SX also introduced no distortion into the source video, remaining completely transparent to it.

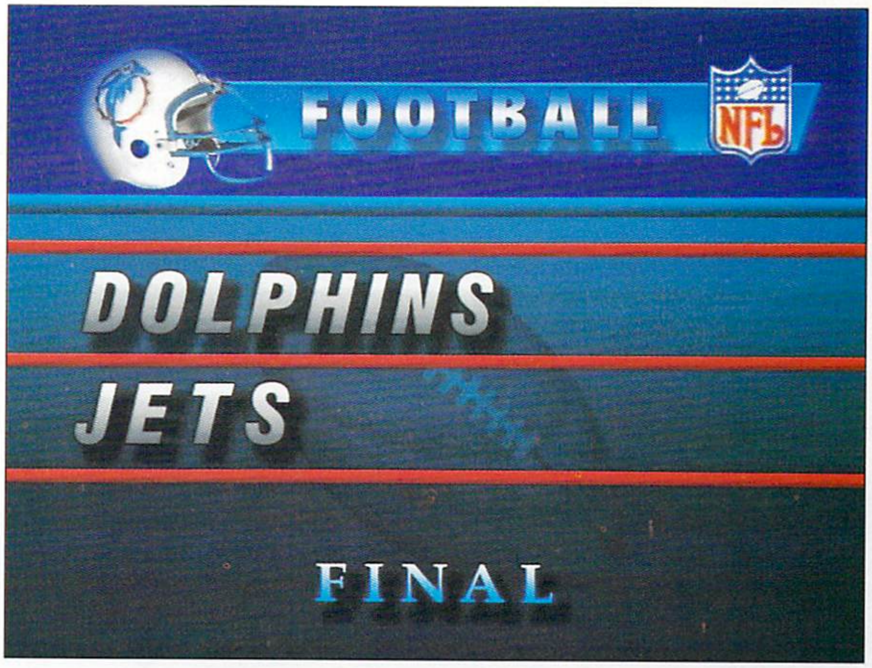
AGA Editing

One of my main concerns was how well the SX transcoded the RGB output of the A4000 AGA graphics to S-VHS. I loaded a graphic created with Brilliance and MONTAGE 24 and adjusted the SX faders for graphics only. Amazingly, the S-VHS output compared favorably with the Amiga's RGB display, although it was not as sharp. I recorded the S-VHS output graphic to videotape, and the playback results were stable and clean.

I also prepared a text page with the MONTAGE 24 color-font options, employing a page of fonts that used the gradient-fill feature—set from yellow to the maximum red. I also made sure the NTSC filter in MONTAGE was toggled off. This time I superimposed the textual page over the same prerecorded S-VHS videotape as in the first test, and the result was a clean and stable image except for some dot and chroma crawl around the red edges of the fonts. The 3.58-MHz Notch filter made the

To locate the vendors of the products reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 94.

W S





Broadcast-quality images with text overlays are as close as your Amiga with SuperGen SX.

dot and chroma crawl disappear and produced only a slight blur on the edge of the fonts.

Actually, this test was sort of a dirty trick to pull on the SX. After turning on the MONTAGE 24 NTSC filter, the image was nearly perfect, and when I recorded the same signal to tape and played it back, it was broadcast quality. The last step in this test was to make a dub of the edited footage. The results were excellent; even the normally unstable reds looked just fine on the monitor.

The Natural

SuperGen SX's compatibility with Amiga AGA computers makes it a natural for transcoding these machines to S-VHS, thus opening the door to a cost-effective way of creating information channels for cable television. The mix of textual info and AGA graphics is a definite plus, so Amiga users interested in squeaky clean S-VHS output can employ the SX in a variety of applications.

From the helpful documentation to the superb signal quality, the SuperGen SX delivers with flying colors. Although it does not quite match the performance of the 2000S, it comes mighty close. For the price and versatility, it just can't be beat.

—Joel D. Tessler

Half-length, 16-bit sound card and software.

Wavetools

***Digital Audio Designs*, $450**

A2000, A3000, A4000, or Zorro II-compatible expansion chassis.

2.0/3.0 compatible.

Hard-drive installable.

Not copy protected.

Accelerator compatible.

***Installation:* Easy.**

***Minimum system:* 2MB, hard drive.**

***Recommended system:* 68030 or better microprocessor, hard drive with 500K/second or faster transfer rate, 4MB, stereo amplifier, speakers.**

The ideal Amiga sound card must offer a minimum of 16-bit stereo digitizing and recording, plus playback capabilities. It should also have editing and mixing provisions for basic recording and the potential for future expansion, perhaps via a plug-in card. Digital Audio Designs' new Wavetools fulfills all these requirements for a very reasonable $450.

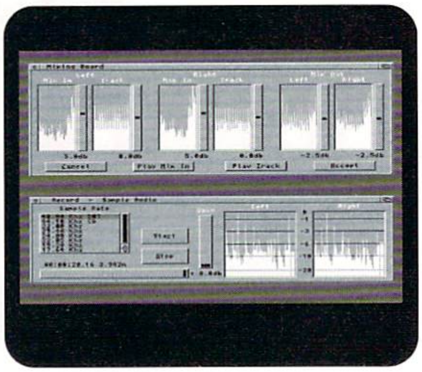
The half-length, 16-bit sound card plugs into any vacant PC slot and connects using four RCA jacks on the rear. Another 50-pin, rear-mounted con- ►

nector is wisely labeled "Not a SCSI connector." Software installation merely requires dragging the program icons from the accompanying floppy disk to your drawer of choice on the hard drive.

MUSIC MAKER

With Wavetools, you perform audio recording and playback to and from the hard drive. Although a data-transfer rate of less than 200K per second should be adequate, I'd recommend a faster hard drive. The package supports eight sampling rates, including 48, 44.1, 32, 29.4, 24, 22.05, 19.2, and 17.64K per second. The first two rates correspond to those used for digital audio tape and CD recordings. Because all of Wavetools' recording and playback involves the hard drive, the maximum length of a recording depends on the sampling rate and your drive's capacity. At 48 kilosamples per second, one minute's worth of 16-bit stereo requires an 11.5MB sound file!

During recording, Wavetools' software lets you adjust the input gain over a span of 22.5 db, whereas during playback the adjustment spans 46.5 db. Built-in filtering eliminates aliasing distortion. Audio-editing functions include cut, copy, paste, and mix. The mixing function, which combines a second sample with the current sample, provides the left and right channels with six separate gain controls having a +/–32 db range for both input files as well as the output file. These adjustments let you control the balance of the mix. The mixing function also includes an undo buffer that requires an additional disk file with a size proportional to the duration of the mix.


Wavetools' Workbench control panels.

Wavetools' interface uses a series of windows that open on the Workbench. The heart of the control center is a small panel with accompanying pull-down menus. There are zoom controls, start-and-stop playback, and gain for playback volume.

Recorded samples are displayed in resizable windows, and it's easy to cut and paste between them. You need two open sample windows for mixing. A recording window, opened from the main control panel, provides software gain control of the input level, sample rate selection, progress indicator, and oscillographs to monitor both input channels.

Wavetools comes with 75-page manual, complete with installation and set-up procedures, tutorial, and reference sections. The tutorial does a good job of getting newcomers to the world of 16-bit sound up and running.

FUTURE PLANS

Special effects in Wavetools are limited to a volume change of a marked range, with separate level controls for the left and right channels. According to Digital Audio Designs, the standard Amiga hardware is incapable of real-time special effects on 16-bit stereo samples at full-fidelity sampling rates. To ensure such effects, the manufacturer plans to release its RTX real-time extension board ($329) for Wavetools later this year.

What you get with the current product

is a fast, slick, 16-bit sound card and software. All the audio samples I generated were clean and free from noise and distortion. If you're in the market for a true 16-bit stereo sampling, editing, and mixing package that promises future RTX expandability, don't overlook Wavetools.

—Morton Kevelson

ANIMWORKSHOP VERSION 2.02

Axiom Software, $159.95

All Amigas.
2.0/3.0 compatible.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
***Minimum system:* 2MB.**
***Recommended system:* 4MB, 2MB chip RAM, AGA Amiga, hard disk.**

ARexx-compatible animation tools.

Version 2.02 of ANIMWorkshop, a program used to create, edit, and enhance Amiga ANIM-format animations, represents a major step forward from the first release I reviewed (Aug. '93, p. 18). The tools are more flexible, the interface more usable, and the features far more contemporary. The ease with which you can manipulate your files makes this an indispensable tool for animators.

QUALITY REBUILD

ANIMWorkshop now fully supports ANIM-5, -7 and -8 formats, complete with XOR encoding and multimedia support. Thirty-two-bit Amigas like the 1200 and 4000 can take advantage of the playback speeds offered by ANIM-7 and -8 formats, which support AGA as well as DCTV and HAM-E color resolutions. Editing functions let you modify existing animation files by inserting, appending, or deleting frames or complete animations. Control over global or individual frame rates lets you insert sound files to be played at specific frame numbers.

The program is a front-end for file handling, and it calls either Art Department Professional (ASDG), or ImageFX (GVP) for image-processing tasks. Naturally, you must buy these programs separately, and they may involve other hardware and software requirements than those listed for ANIMWorkshop.

The new high-resolution interface screen sports attractive 3-D buttons and 2.0 requesters. The screen is divided into six areas, with the entire right side reserved for file-list handling. This list lets you add individual frames or complete animations, which are then processed into a new animation. Buttons below the file list provide such functions as sorting, deleting, and adding more files. ANIMWorkshop's file requesters support asterisks as wild cards and let you easily add an entire group of similarly named files to your file list. You may also select files or ranges thereof for processing, and you can save lists of files for repeated processing—very useful for experimenting with animation creations.

AND ON YOUR LEFT...

The left side of the interface screen has five smaller sections, all related to the animation or to processing tools. After you load an existing animation, the program displays information about size, ►

format, resolution, and so on. In playing the animation, you can overlay a control panel that has VCR-type controls for pause, rewind, frame advance, and other functions. Using either this panel or keyboard commands, you can adjust global frame-rate timing as well as tag frames within the animation. By tagging frames, you identify them for timing changes, adding sound files, or splitting animations, as well as marking edit points for adding or deleting specific frames. When you're adding sound files to your multimedia animations, ANIMWorkshop lets you manage volume, channel, and background or foreground priority. Another nice addition lets you insert textual information into the animation file.

One major screen section here is the tools area, where you select the type of processing needed to create or alter your files or animation. Briefly, you can add or remove loop frames; grab, delete, insert, offset, replace, scale, flip, or combine frames; split or convert animations into frames; or do any type of custom processing provided by ADPro, ImageFX, or other ARexx-supported programs. Then you can easily select groups of files or existing animations and use one of the many special image-processing effects available. There are more than 60 ADPro ARexx scripts provided as processing examples. Finally, two sections in the interface are for loading either ADPro or ImageFX directly from ANIMWorkshop, and for setting conversion options.



ANIMWorkshop 2.02 sports a snazzy new hi-res interface with 3-D buttons.

Several features I found useful include the ability to wait for frames of an animation to be created rather than read them from a list—a real time-saver. And thanks to a combination of creating, compressing, and deleting animation frames, 3-D or morph programs work smoother. You can also use ANIMWorkshop as an animation-format converter. For example, you could load an Opt-5 ANIM and then save it as an Opt-8.

Read On

ANIMWorkshop is not without its flaws. There's the occasional system crash or inability to load a freshly generated animation. In addition, if you use ImageFX 1.5, you need to obtain a version of it dated later than July 1993. I'd also like, instead of being referred to the manual, to see drop-down lists of file loaders and options when I'm accessing one of the image processors.

The support for current ANIM formats and multimedia files was a necessary addition, and including complete and easily implemented support for ADPro, ImageFX, and ARexx are bonuses that make this program a worthy tool for creative animators. I also appreciate the inclusion of a distributable animation player and a utility for converting older ANIM files into Opt-5 format. Axiom has made great strides with this revision.

—Steven Blaize

CNet Pro 3.05c

Perspective Software, $229.95

All Amigas.
2.0/3.0 compatible.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
Minimum system: **2MB RAM, hard drive, modem.**
Recommended system: **Large-capacity hard drive, 9600-baud or faster modem.**

Bulletin-board system software.

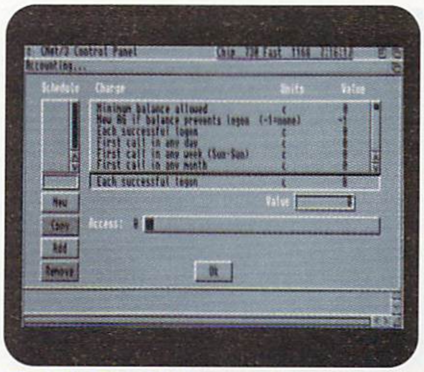
While no electronic bulletin-board (BBS) package is particularly easy to use, CNet Pro 3.05c—significantly enhanced from earlier versions—provides a wealth of features and options that can make life easier for an Amiga BBS sysop.

Call Waiting

Whereas previous set-up procedures required using the CLI, CNet Pro 3.0 has a standard installation program, and a new graphical user interface now makes BBS setup much easier. The program supports all the usual BBS functions—file transfers, e-mail, message bases, on-line games and Doors, to name but a few. Built-in support for Fidonet and Usenet messages is also present, although access to Usenet requires a copy of Matt Dillon's UUCP software (available in the public domain and from Perspective Software's BBS). There are plenty of options available, so you can easily customize the system to your liking.

One unique feature is that you can check incoming calls using Caller ID, as long as you have a modem and phone lines that support it. By keeping track of the source of incoming calls, Caller ID enables you to accept calls only from previously validated phone numbers.

To the dismay of users, but to the delight of those running a "pay" BBS, you can assign a user fee to virtually every accessible option in CNet Pro. It's also possible to arrange that specific functions—such as uploads—give users credit against their charges. These charges and credits can also accommodate rate variations according to the time of the call or the access group of the user.



The CNet Pro 3.05c control panel.

Housekeeping Duties

The BBS's maintenance features include activity logs for calls, uploads, and downloads. Activity monitors and graphs also let you check on BBS usage with a variety of parameters, and there are a number of auto-maintenance commands that can delete old messages, files, and even inactive users after a given length of time. The BBS also ►

supports sysop-timed events that change the setup of the program at a particular time. For example, you can use this function to let new users call into the system only at certain times, or to permit calls only at certain speeds during selected hours. You can schedule such events to occur at any desired intervals from once a minute to once a year. This extremely powerful feature makes setting up different access levels during "peak" and "off-peak" hours much easier.

An excellent manual supports the program. Comprehensive, detailed and well-organized, it includes an index and a glossary of the terms used throughout the documentation. And if you're updating from a previous version, the manual presents all the necessary instructions on bringing your particular version up to date. Perspective Software also has a support BBS for more information, as well as to download enhancements and revisions to the software.

Overall, Perspective Software has done an excellent job of upgrading CNet Pro. It would be my first choice for setting up a BBS on the Amiga.

—Dave Thomas

Cocoon Precision Morphing

DevWare, $99.95

All Amigas.
2.0/3.0 compatible.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
***Minimum system:* 2MB.**
***Recommended system:* 4MB, AGA Amiga, accelerator, hard disk.**

Entry-level morphing program.

If you're looking for an easy-to-use morphing program for your Amiga, don't overlook DevWare's new Cocoon Precision Morphing, with which even a novice animator can quickly achieve impressive results. Unlike 3-D modeling programs, which interpolate the shapes of two objects to achieve morphing, Cocoon utilizes 2-D warping. Instead of simply dissolving from one image to another, Cocoon "warps" transitional images to make one image appear to transform into another.

Points and Lines

Once installed and running, Cocoon presents a slick, although rather unconventional interface, with most work



Cocoon makes morphing fast and easy.

accomplished on one screen. Creating a morph is fairly simple: You first load in a source image file, which is rendered to the left side of the screen. Then you load the destination image that the source file is to become. By selecting points and outlining corresponding features on both the source and destination screens, you instruct Cocoon on how it should morph one image into the other. You isolate the features to be morphed with basic editing tools that place points and lines. A magnification option is also available, though I found it somewhat kludgy and sorely in need of an undo function.

Cocoon reads 24-bit (including ToasterPaint and LightWave), standard IFF, AGA, and HAM images, but saves finished frames only into 24-bit, HAM, HAM8, or 16-level grayscale. There appears to be no direct support for DCTV, Opalvision, or the popular Retina 24-bit board.

Morphs In Motion

The metamorphosis occurs over whatever number of frames you request; naturally, the more frames, the smoother the transformation. While Cocoon is quite adept at morphing single images, it also supports motion morphing, the warping of one animation into another. Cocoon also has a key-frame option that makes it relatively simple to create interesting animation frames in a relatively short time. Other interesting features include cross-dissolving, matte and transparent color compositing, and a provision for loading static backgrounds for animations.

Cocoon is not without irksome traits. Foremost is the lack of built-in animation provisions, so you will have to supply a program to cobble together rendered frames into an animation. Also, Cocoon is picky with the various IFF file formats. The program often told me that a graphics file I was attempting to load was not an IFF file, even though it loaded just fine as an IFF into other programs. Another drawback is that source and designation images must share the same resolution. You can't, for example, warp a 320x400 HAM image with a 640x400 IFF file. In a similar vein, don't expect to morph high-resolution or 24-bit images with a stock Amiga. In fact, you'll need a hefty 8 to 12MB of memory and 2MB of chip RAM for large projects. Even when working with low-resolution or HAM images, you'll want at least 4MB and will have to rely on Cocoon's disk-cache schemes to utilize all the features this program has to offer.

For the money, I consider Cocoon a good introductory program for someone itching to learn the fundamentals of morphing. A little effort and some patience will achieve surprisingly good results. Advanced and expert animators, however, may find Cocoon's features too limited for professional applications.

—John Ryan

SBase4 Professional 1.3G

Oxxi, $299.95

All Amigas.
2.0/3.0 compatible.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
***Minimum system:* 2MB.**
***Recommended system:* 4MB, accelerator, modem, hard disk.**

Programmable relational database for business and large-scale applications.

SBase4 Personal 1.3G

Oxxi, $149.95

All Amigas.
1.3/2.0/3.0 compatible.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
***Minimum system:* 512K.**
***Recommended system*: 2MB, accelerator, modem, hard disk.**

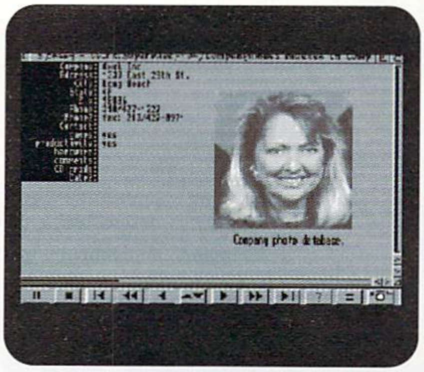
Relational database for small inventories and home and small organizations.

The most important program for many users of hard drives and other mass-storage devices is a database. On the Amiga, the clear choice for years has been the highly versatile Superbase family. Distributed and supported by Oxxi, Superbase has endured numerous

revisions and now goes by the title SBase4, with both Personal and Professional versions.

Familiar (Inter)Faces

Both SBase4 Personal and Professional arrive as compressed files on a single floppy, and Commodore's Installer program does the installation gig. The main manual, shared by both programs, is bulging with more than 300 pages of lengthy tutorials and examples, with Pro getting a separate Database Management Language manual. Although the manuals are clearly marked, Personal users might find it disconcerting to see features not applicable to their program. Both versions of SBase4 retain Superbase's powerful and intuitive VCR-type screen controls. Creating a new file is simple. Just enter a filename, click a few screen buttons, define the number of fields and their contents, and you're off. Once the data is entered or imported, you can use the VCR-like controls to advance one "frame" (i.e., record) at a time, or to scan through your data quickly or slowly, forward or backward, with buttons for pausing and stopping.



External images complement SBase files.

In addition, you can search for data by index, or through the filter, which allows you to construct complex search criteria in seconds. For example, a search for all of the widgets inventoried in August and sold by January could be constructed with a few mouse clicks.

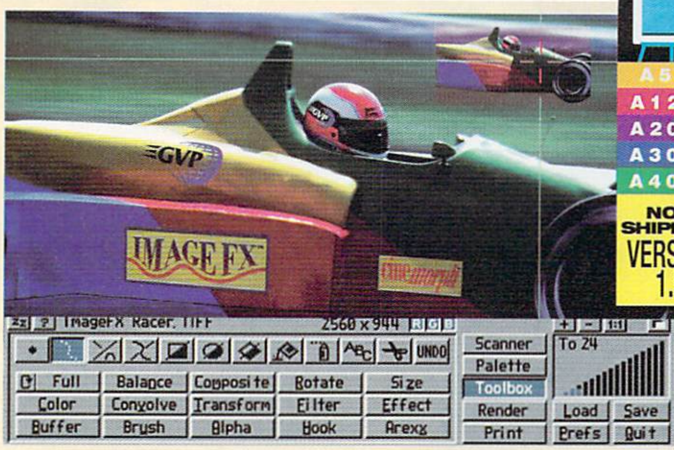
Both databases are of a relational, rather than flat, design. Simply put, this means that data fields within a file can refer to fields within another, separate file. SBase4 Pro is a large (660K) program, with storage capabilities limited only by your RAM and hard-disk space. The capabilities are seemingly scaled for government agencies—storage space permitting, you could have a file with one trillion records and 999 separate indexes. Its lesser sibling, SBase4 Personal, allows "only" 16 million records per file. Right.

Another big SB selling point has been the ability to handle external files, whether text files, scanned or drawn graphic images, sampled sounds, or even animations (Pro only). Arexx support in Pro makes transferring external files a snap. An employee or small-town police ID file could contain photos, signatures, and voice samples if desired. Parts inventories could be enhanced with drawings or scanned images of items.

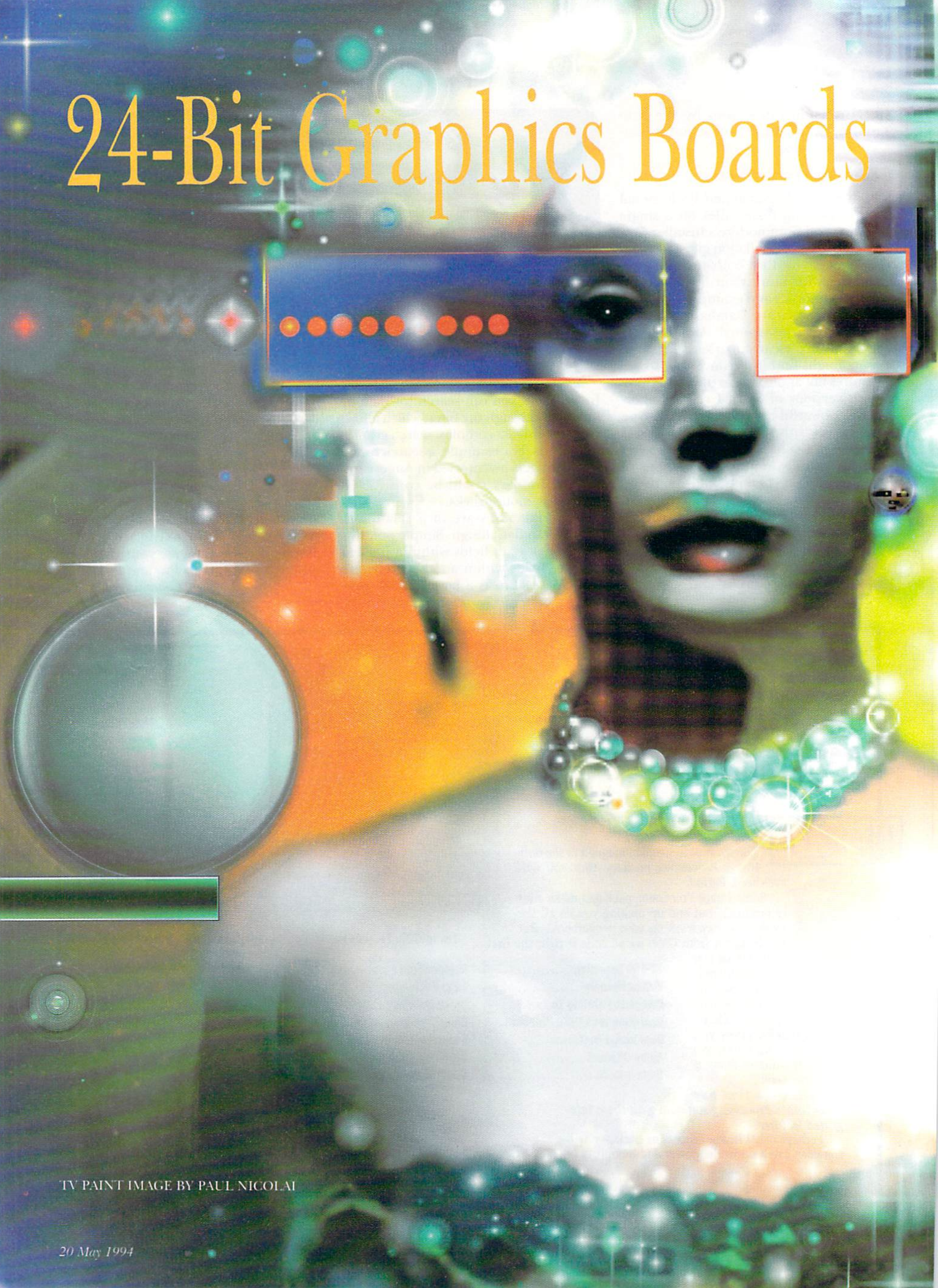
Forming Lines

No matter how easy the data manipulation is, data entry is even more important. If the data is entered incorrectly due to confusing or poorly designed entry screens, your database suffers. SBase4, both Pro and Personal,

Continued on p. 82.



24-Bit Graphics Boards



TV PAINT IMAGE BY PAUL NICOLAI

Revisited

BY SHELDON LEEMON

High-powered developments have overtaken the field of high-color, enhanced display devices since AW last paid a visit. We'll mark your scorecard and help you learn the newcomers, the updates, and the pretenders waiting in the wings.

WHAT A DIFFERENCE a year makes! When *AW* last examined Amiga graphics boards, at the beginning of 1993 (see "Devices & Desires," Feb. '93, p. 30), we found them to be fairly expensive (most over $1000) and limited both in features and in software support. In just a little more than a year, however, several developers have managed to overcome almost all of the initial difficulties. What we have is a whole new generation of 24-bit graphics cards that are not only more affordable, but also work with a wide range of current applications software.

Some of the credit belongs to the IBM PC market. As 24-bit color cards have become more popular, IBM board manufacturers have designed inexpensive VGA chips that contain almost all of the circuitry needed for a complete display system. Using one of these VGA chips, all that an Amiga board designer would have to do is add a few RAM chips and a little interface circuitry to produce an "instant" Amiga display card. The widespread acceptance of Workbench 2.1 and 3.0 has also helped. These updates to the Amiga system software make it much easier to add screen modes that are both larger than the original 640x400 modes and offer 256 or more colors.

Improved Performance Factors

YET, MOST OF the credit for the new generation of boards must go to the ingenuity and persistence of Amiga board developers and software designers, whose hard work has yielded a number of significant improvements in the current generation of display cards.

The major focus of our present survey will be on three new boards that have appeared since our last roundup: Retina (MacroSystemUS), Picasso II (Expert Services), and EGS 28/24 Spectrum (GVP). In the sidebar "Update Report . . . and Coming Attractions," we'll also give you a rundown of recent updates to some of the display boards covered last ►

time: ACS's Harlequin Plus, GVP's IV24-4000, NewTek's Video Toaster, MicroPace's Visiona, and GVP's EGS-110/24. Plus, we offer a preview of four promising new devices due out later this year: Retina Z3 (MacroSystemUS), Talon (DKB), Merlin (Spectronics), and Piccolo (Creative Computers).

But before we examine the boards individually, let's take a look at some of the overall enhancements they offer in more detail.

More Modes

Many first-generation display boards offered only a couple of different display sizes and color modes. Today's boards allow you to choose as many (or as few) colors as you want, from 2 to 256 just like the AGA machines; in addition, they offer special high-color modes with 65,536 or 16.7 million colors. They also provide a variety of screen sizes, from 320x200 to 1600x1200. Most boards even allow you to create custom displays, expanding the screen size to the limits of the display capabilities of your particular monitor (see below).



Many hardware developers have written special drivers that allow Real 3D (which Grant Neisner used to create this image) output files directly to their boards in 24-bit color.

Monitor Compatibility

The current display cards work with a wide range of monitors, from the lowly Commodore 1084 all the way to 30-inch Super-VGA monsters. For the best results, you'll need to get a VGA or SuperVGA monitor. But regardless of the monitor you choose, you'll find that the software that comes with these display cards will allow you to get the maximum benefit from that monitor. The software is either optimized for five or six different classes of monitors or is tailored to specific models and types—sometimes a dozen or more.

In addition, many of these boards come with customization software that allows you to create new display modes to suit your monitor. For example, my old Mitsubishi Diamond Scan monitor doesn't have a high enough horizontal scan rate to support a 1024x768 noninterlaced display, but with some tweaking, I found that it could manage 928x696. I also found it handy to create screen modes for particular applications. In desktop publishing, for example, the pages are longer than they are wide, so 608x800 may be a more practical mode to use than 800x600. And since video pictures usually measure about 768x482, it's nice to be able to run your 24-bit paint program in a screen that is about the same size. Another useful feature of these customization programs is that many allow you to adjust the size and position of the display. This helps to reduce the big black borders that so many Amiga owners find objectionable.

Monitor Switching

One of the biggest problems with the first generation of boards is that you needed two monitors to run them: one connected to the normal Amiga video output and a second connected directly to the board. Even if you had a monitor that could synchronize to the proper range of horizontal scan rates (15.75 KHz for the Amiga port, 31.5 KHz or higher for the display card), and was capable of working on both ports, the only way to connect it to both ports was via an external switch box used to manually switch between displays.

Many of the current display cards, however, include an automatic monitor switch. These board provide a cable that connects the Amiga's 23-pin video port directly to an input on the display card. That way, the card can direct either the native Amiga display or the enhanced display from the board to the monitor, switching between the two under software control. When you change screens (by opening a new application, or using the Left Amiga-M key combination), sophisticated system software determines whether the new front screen is an Amiga mode or an enhanced mode, and switches the display output accordingly.

Monitor switching works well if you are using a monitor, such as the Commodore 1942, that handles both Amiga and enhanced modes. If you have a higher-resolution monitor, however, you will still need a second Amiga display (such as a 1084) if you want to use programs that can't adjust to new modes. These days, self-booting games are about the only kind of software that can't be adapted to new displays, so if you are willing to forego game compatibility, you can get along fine with only an enhanced monitor.

Zorro III Support

While most of the first-generation boards were designed for the 16-bit Zorro II slots found on the Amiga 2000, some of the newer boards are designed for the 32-bit Zorro III slots found on the Amiga 3000 and 4000. This can help speed up data transfers (such as loading and saving pictures) significantly. One board, the EGS 28/24 Spectrum from GVP, even adapts automatically, using the 16-bit transfers when installed in an A2000, and 32-bit transfers when it is plugged into an A3000 or 4000.

Variable Memory

Most of the new boards come with more than one memory configuration, which allows you to trade off between a low-cost version with more limited display modes, and a more expensive version with higher color

and pixel resolutions. Some allow you to upgrade the board by adding your own memory chips.

SOFTWARE SUPPORT

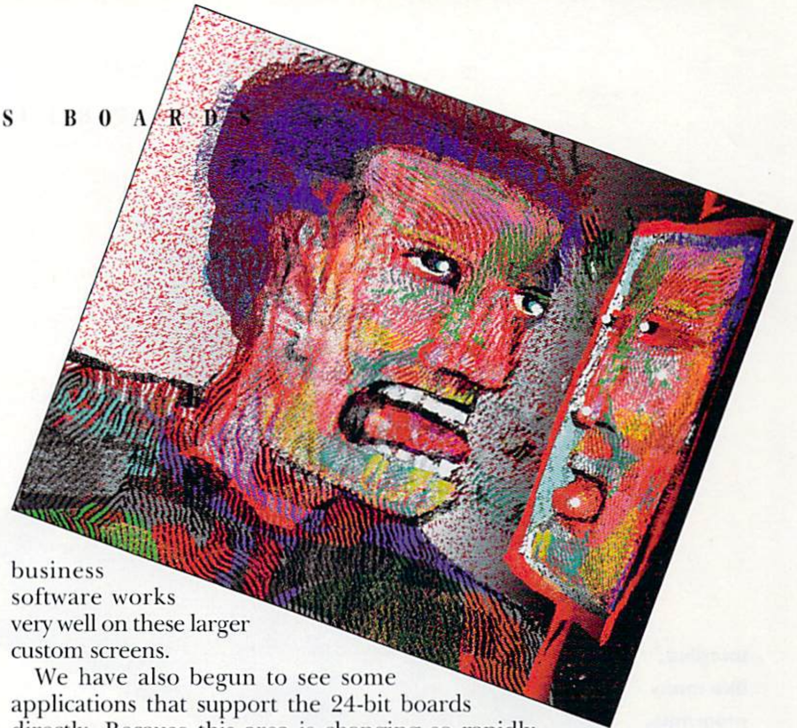
One of the biggest problems with the first generation of 24-bit boards was that they didn't work with much of the existing applications software. Although several manufacturers tried to get software vendors to come out with special versions that supported their boards, very little of this special software ever made it to market. This severely limited the usefulness of these boards; you could paint pictures with their special paint software, or display pictures with their special display software, but that was about it.

The latest models are free of most such restrictions. They are able to run a wide range of existing applications on colorful, high-resolution screens. About the only programs they don't support are self-booting games and other high-performance graphics software that writes directly to the Amiga display hardware. For example, video-titling software, such paint programs as DeluxePaint (Electronic Arts) and Brilliance (Digital Creations), and other applications that try to move things around in real time do not hold up well with these boards. (Of the new models, Picasso II seems to support DPaint most fully.) As far as 3-D software goes, most programs tend to work fine with the boards, seeing that these are definitely not real-time applications!

One way in which these boards provide compatibility with existing software is through a technique known as Workbench emulation. Almost all of today's boards provide special system software that allows you to open the Workbench in any of their expanded screen sizes. Workbench emulation guarantees that you can run any Workbench program, or any application that can open a screen on the Workbench, in just about any mode you wish. That takes care of most word processors, desktop-publishing packages, database programs, and spreadsheets.

Let's say, however, that your productivity programs don't open on the Workbench, or that you'd rather open them on a custom screen of your choosing. Most boards allow you to do just that, employing the same methods AGA machines use to get old programs running in new modes. This strategy is often referred to in the advertising as "retargettable graphics," because it intercepts commands sent to the native Amiga display system, diverting them to the graphics board instead. First, the board's system software registers the enhanced-screen-mode information in the Amiga's display database (like the monitor drivers in the DEVS:Monitors drawer do). This means newer applications programs that allow you to select a screen mode using the standard requester (like the one in the Preferences ScreenMode program) can take advantage of whatever new modes these boards offer.

Second, most boards include software that functions like the "Mode Promotion" option in the Preferences IControl program. Whenever an application tries to open a screen of a particular mode, the promotion program steps in and changes it to another mode. That way, for example, you can get a desktop-publishing program to open a screen on a 1024x768 display, or a 1024x768 scrolling screen on an 800x600 display. Mode promotion doesn't work with all applications, particularly older programs that insist on a given screen size, but recent business software works very well on these larger custom screens.



TV Paint, which Paul Nicolai used to create this work, comes in versions tailored for several boards.

We have also begun to see some applications that support the 24-bit boards directly. Because this area is changing so rapidly, though, we cannot cover it in definitive detail. Direct support for applications is achieved in one of two ways: Either the software developers create specialized versions of their programs to take advantage of the boards, or they make an interface available that the hardware manufacturers can access via drivers. TV Paint Professional by Tecsoft is a prime example of the former case; there are versions of the program for most of the current crop of boards (in fact, most boards ship with a version of TV Paint —Pro or Junior— included). Emplant (Utilities Unlimited) and A-Max (ReadySoft), the Macintosh emulators, include direct support for some of these boards, too, as does Terra Nova's Magic Lantern animation utility. I've heard that the next version of DPaint will work directly with almost all of the boards, and that Brilliance, too, may be customized for the hardware at some point.

Most boards provide drivers for ASDG's Art Department Professional and GVP's ImageFX image processors, and for Real 3D (Realsoft International). (Spectronics, for instance, sells individual drivers for $25 each that interface Real 3D, DCTV, and other packages with the Merlin board.) In addition, many boards include both applications software (such as paint and display programs) and utility programs that directly support their special displays.

Of course, software compatibility is still not perfect. Since these boards usually have only a single hardware sprite for the cursor, software that uses several Amiga sprites (games, mainly) won't work on them. Also, some Amiga operating-system features that depend on the display hardware, such as screen dragging and scrolling, may not work in exactly the same way on these boards. And most boards are limited to some degree by the Amiga system software (only the Retina, for example, allows more than 256 colors on the Workbench). These restrictions aside, however, you should be able to make full use of these boards with most of your favorite software.

3 New-Generation Graphics Boards

SINCE OUR LAST survey of enhanced-display devices, three brand-new boards have appeared, and ►

each has had a significant impact on the 24-bit graphics scene. In addition to the descriptions below, see the feature-comparison chart opposite. *(To contact developers of products covered in the main article, charts, or sidebar, consult the "Manufacturers'/Distributors' Addresses" list on p. 94.)*



Imagine, like many programs, can run its interface on the new graphics boards. While you cannot save 24-bit Imagine files (such as this one by Phil Wolstenholme) directly to the board, you you can view them in full color using display software.

Retina
MacroSystemUS
$399 (1MB), $449 (2MB)

The Retina was the first low-cost, full-featured 24-bit Amiga graphics card to appear in the US. It offers extensive software compatibility, and it provides special support for the A2000 and 3000 that allows those older machines to run 256-color AGA productivity software. The board also comes with a good assortment of custom software, including a paint program (XI Paint), a picture viewer, and a number of utility programs. The Retina is also one of the few boards to include a program for creating and displaying high-color animations. Software for MacroSystem's VLab video-capture board directly supports the display of both still pictures and animated sequences on the Retina. You can also purchase a 2MB version of the Retina that includes TV Paint Pro software for $749 (4MB for $899).

The Retina comes with a long list of pre-programmed display modes, plus a program that lets you create custom-display modes. It can scan at standard video rates, and MacroSystem offers an external composite encoder that allows you to convert Retina output to a television-style video signal. The board holds up to four megabytes of display RAM (using user-installable ZIP chips), which means bigger screens with more colors (including 24-bit screen resolutions exceeding 1024x768 pixels). This capability is particularly important for graphic artists involved in print work, where the bitmaps can exceed 2000x3000 pixels.

The Retina does have a few minor drawbacks. Unlike the very latest boards, it has no automatic monitor switch, so if you plan to use software that is specific to the Amiga display (like self-booting games), you'll either need a second monitor or a manual monitor switch. MacroSystem says it plans to offer an external automatic monitor switch in the near future. Also, because it endeavors to offer maximum compatibility with older Amiga programs, the Retina's emulation software is loaded with options that make it a bit more complex to use. For example, changing the resolution of Workbench takes two or three steps instead of one as with the newest boards. The system software doesn't support the Workbench display database, which makes it harder for cooperative programs to use its new display modes directly. Finally, its AGA emulation runs fairly slowly on the original board. A3000 owners in particular should look to the new Retina Z3 board for improved performance (see the "Coming Attractions" sidebar). Despite these limitations, however, Retina works as advertised, and is still one of your least expensive choices.

Editor's Note: At press time we received word that new software will be available for all Retina boards by the time you read this. It is reported to run five times faster than the older software—even on the early boards—and, unlike the current software, it will not use your system's chip RAM. Current owners can upgrade for $25.

Picasso II
Expert Services
$549 (1MB), $614 (2MB)

The Picasso II uses a standard VGA chip (the same Cirrus Logic chip used by GVP's EGS 28/24 Spectrum, in fact), but interfaces it a little differently. Picasso maps its display memory right into the space normally used for expansion RAM (instead of the I/O space used by other boards). This approach helps speed up the manipulation of graphics memory, particularly on an Amiga 2000. On the other hand, it also limits the amount of fast RAM you can add to an unaccelerated A2000 to six megabytes, instead of the usual eight.

The Picasso II system software is simple to install using the standard Installer program, and it is just as easy to remove it, via the included de-install script (a courtesy most developers omit). Once you've installed the software, you'll notice that the ScreenMode Preferences editor lists several new Picasso modes you can use for your Workbench screen. And when you run an applications program like a word processor, the ChangeScreen program will automatically ask if you want it switched to one of the new Picasso modes. You'll use your computer just as you always have, but with a larger choice of screen modes.

It's fortunate that the Picasso is so easy to use, because the documentation is translated somewhat roughly from the original German. In fact, IntuiSpeed, a test program that comes with the package, still has buttons labeled in German. There is some documentation on disk in AmigaGuide format, however, which is complete and easy to understand.

The Picasso II board comes pre-programmed for a lot of screen modes, and though it does include a program to let you create your own custom modes, it doesn't give you quite as much control over size and position of these screens as similar programs on the Retina and Spectrum cards do. The Picasso includes an automatic monitor switch, so you can use one monitor to display both Picasso-mode and normal Amiga-mode screens (if you have a monitor that supports both), and switches between them quite naturally.

The Picasso comes with somewhat less software than the other boards—a display program, TV Paint Jr., a

screen grabber, and a screen blanker. It also includes a shareware version of MainActor, an animation creation-and-display utility, although the save feature is available only on the registered version (which costs $50 more).

EGS 28/24 Spectrum
GVP
$499 (1MB), $599 (2MB)

Want a board that works in your A2000 but works even faster, automatically, if you switch to an Amiga 4000? GVP's EGS 28/24 Spectrum, which adjusts to either the 16-bit bus of the Amiga 2000, or the 32-bit bus of the A3000 and A4000, will do just that. Like the Picasso, the Spectrum board also provides automatic monitor switching for a true one-monitor solution.

The Spectrum features the EGS compatibility software libraries from Viona Development. EGS provides not only Workbench emulation and display-database compatibility, but also its own operating environment, with such convenience features as tear-off menus and its own Preferences settings (for screen mode, colors, fonts, input, mouse pointer, and so on). EGS provides very sophisticated support for multiple boards and monitors, allowing you to move your pointer off the edge of one monitor and onto another.

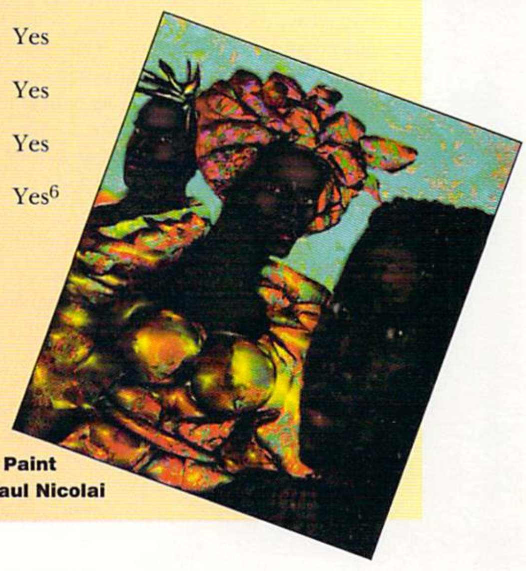
There's a lot of EGS software that comes with Spectrum, including a display program, screen grabber, clock, text reader, a game, screen blankers, and software to create a "wallpaper" background picture. The board also comes with Spectrum Paint, ►

Feature Comparisons of 3 New 24-Bit Graphics Cards

PRODUCT NAME	**Retina**	**Picasso II**	**EGS Spectrum**
Manufacturer	MacroSystemUS	Expert Services	GVP
List Price	$399 (1MB) $449 (2MB)	$549 (1MB) $614 (2MB)	$499 (1MB) $599 (2MB)
Amiga Models Supported	2/3/4000	2/3/4000	2/3/4000
I/O Width	16-bit	16-bit	16/32-bit[1]
Maximum Memory	4MB (ZIP)	2MB (DIP)	2MB (SOJ)
Color Resolutions (bits)	1–8, 16, 24	1–8, 15/16, 24	1–8, 16, 24
Max. Pixel Res. (8-bit)	2400x1200(i)	1600x1200(i)	1600x1280(i)
Max. Pixel Res. (24-bit)	1152x862	800x600	800x600
Monitor Types	1084, VGA, SVGA	1084, VGA, SVGA	1084, VGA, SVGA
Auto Monitor Switch?	No[2]	Yes	Yes
Workbench Emulation?	Yes	Yes	Yes
Mode-Promotion Software?	Yes	Yes	Yes[3]
AGA Emulation?[4]	Yes	No	Yes
Multiple Boards?[5]	Yes (up to four)	No	Yes
Work w/Toaster?	Yes	Yes	Yes
TV Video Output?	Yes[6]	Yes[6]	Yes[6]

NOTES

(i) = interlaced
[1] via auto-sense
[2] External automatic monitor switch will be available in the near future.
[3] Mode-promotion software is available with the new Spectrum software.
[4] 256-color applications under Workbench 2.1
[5] per computer
[6] External encoder is required.



Another TV Paint image by Paul Nicolai

Update Report . . .

WHILE MOST OF the coverage in the main article focuses on the three graphics boards that have debuted over the last 12 months, you may be wondering what has happened with the original boards presented in our last (Feb. '93) roundup. In many cases, they have been updated to meet the challenge of the new generation of display devices. Here's a brief rundown on the changes:

Harlequin Plus The updated version of the ACS / Haitex Harlequin (from $1085) features four screen sizes—from 640x486 to 910x486—and adds 4-bit (16 colors), 8-bit (256 colors), and 15-bit (32,768 colors) color modes to the board's 24-bit color capabilities. At lower color resolutions, you can flip among several display pages for better animation.

IV24-A4000 GVP has updated its IV24 board to work with the Amiga 4000. It now functions twice as fast as before. Updated software will also be included.

OpalVision Centaur's OpalVision ($699) sports a new version of its OpalPaint software. In addition, if all goes as planned, the promised video add-on modules will be available for sale by the time you read this.

Video Toaster 4000 The recent incarnation of the NewTek classic ($2395) is an A4000-compatible version. The Toaster 3.0 software contained many new features and enhancements (especially to LightWave and the CG), and a 3.1 upgrade is now available (see this month's "Reviews" section).

Visiona MicroPace's board never really entered general release after being announced a year ago. As of this writing, the hardware is finished but the software is being completely rewritten; no definite release date has been set.

EGS-110/24 Since our last article, GVP has released its EGS-110/24 (from $1999), which runs on an Amiga 2000 with a GVP accelerator, but the death of the 2000 has left its status somewhat up in the air. Currently, GVP is selling the board direct to the public here, and also through one German distributor in Europe.

. . . And Coming Attractions

THINGS ARE MOVING so quickly in the world of Amiga graphics boards that as soon as we get one board in for review, we hear about two others on the way. Four we do know something about are mentioned below, and some or all of them may even be available by the time you read this.

Retina Z3 MacroSystemUS' latest version of the Retina card ($699 with 1MB, $899 with 4MB) is optimized for the 32-bit Zorro III bus found on the Amiga 3000 and 4000. The card will include a bit-blitter for enhanced speed, and will cover an even wider range of display resolutions than the original Retina. It will also offer an optional on-board video encoder. MacroSystem plans an upgrade offer for current Retina owners. (Prices quoted do not include TV Paint Pro; maximum RAM is 4MB.)

Merlin Spectronics' Merlin (from $799), a German import, offers most of the important features of the new boards: auto-detect Zorro II and Zorro III bus selection, a built-in monitor switch, a custom blitter, programmable resolutions up to 1280x1024 with 24-bit color, and a RAM capacity of up to 16MB (using proprietary SIMMs). It also includes composite and separated composite (Y/C) outputs for video compatibility. Merlin has three hardware expansion ports for upcoming options such as an overlay genlock and a video digitizer. System software includes HRG compatibility libraries, a display mode customization program, Workbench emulator, and a mode-promotion program. Applications software includes display and animation programs, and TV Paint Jr.

Talon DKB was originally slated to import the Piccolo board from Germany, but has decided to design its own board, the Talon instead. Actually, the company is planning a whole family of boards, but the first one will be this entry-level product priced to sell for under $500. DKB plans to use the EGS software libraries for compatibility.

Piccolo At press time, we received word that Creative Computers will pick up US distribution of the Piccolo board ($589). The Piccolo hardware is very similar to that of GVP's EGS Spectrum, complete with Zorro II/III autosensing. It uses EGS software libraries, comes with its own paint program in addition to TV Paint Jr., and promises optional composite video output. □

—SL

a 24-bit paint program with many high-end features. Spectrum owners will soon be receiving an offer from GVP for a custom version of its popular ImageFX image-processing program, which uses the Spectrum for all of its screen displays, for only $19.95; in addition, they will get a special upgrade offer for version 2.0 of ImageFX when it comes out.

Although the first version of the Spectrum software didn't include a mode-promotion program, the latest version (which should be available by the time you read this) does. The updated software will also feature a simplified installation process, using draggable icons, which should make it even easier to change your configuration.

GVP should be commended for the excellent manual that accompanies the Spectrum board. It is both comprehensive and well-illustrated, and it explains complex issues and operations in clear, precise English.

WRAP 'EM UP!

Even more striking than the quantity of new Amiga graphics boards is the quality of products offered. The new boards (Retina, Picasso, and EGS Spectrum), and those on the way (Piccolo, Merlin, Talon, and Retina Z3—see the "Coming Attractions" sidebar), are so similar in basic display capabilities, compatibility, and price, that shoppers must look to less-obvious issues on which to base their decisions, such as support, the quality and quantity of bundled software, and the reputation of the company providing the board. Some boards may be slightly better than others for a specific purpose: Boards with more RAM and bigger screen displays will be better for graphics and print, for example, while videographers might want to wait for Retina Z3 or Merlin to get a built-in video encoder. If you have multiple-monitor applications in mind, the EGS Spectrum is your best bet, while those needing flexible Workbench emulation should go with Retina, which can emulate applications such as ProCalc even under Workbench 2.1. Most users, however, won't really go wrong with any of them. This means that while your decision may not be an easy one to make, you probably will not regret it. ■

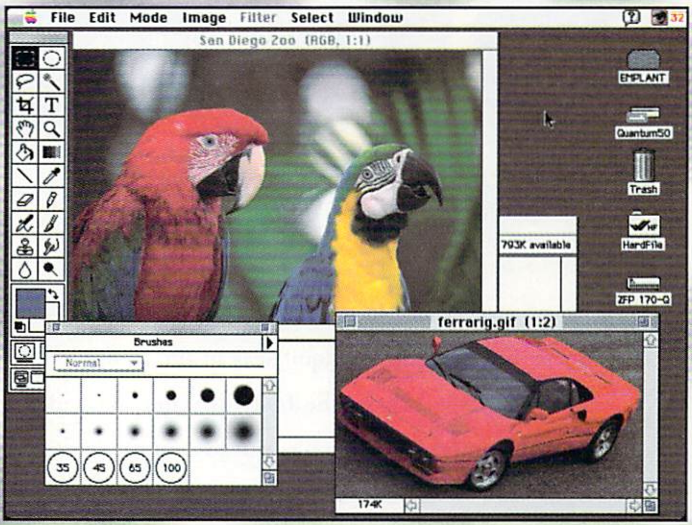
*Sheldon Leemon, a computer/video consultant and instructor, is the author of two books and scores of articles covering the Amiga. He is currently writing a third book, concerning the Video Toaster, and is Amiga Forum Manager on National Videotex Network. Write to him c/o **AmigaWorld** Editorial, 80 Elm St., Peterborough, NH 03458.*

The World's First Multi-Platform Emulation System!

EMPLANT™



24 bit color DeskTop courtesy of a Picasso II video board..



Adobe Photoshop® on your Amiga, in full 24 bit color!

EMPLANT is a hardware device that is designed to allow the emulation of virtually any computer using the Amiga. A simple software driver and ROM(s) from the computer to emulated are all that is required! The hardware holds the key to emulation speed. Custom programmable logic allows the EMPLANT hardware to actually become the exact hardware of the computer it is emulating. Multiple emulations of different computers can be run at the same time using a single EMPLANT board!

Macintosh® Emulation Module

The Macintosh emulation module is a 'generic' Macintosh with the speed of the emulation depending on the processor your Amiga is using. An A3000 is equivalent to a MAC IIci. An A4000 is equivalent to a Quadra 900. Using a 33Mhz 68040 accelerator (such as the RCS Excaliber board), emulation speed is greater than an 840AV Macintosh!

Support for up to 16 colors is provided for non-AGA machines. A4000 owners can use a full 256 colors! Up to 24 bit (16 million) colors is supported using 3rd party video boards such as: Picasso II, EGS-Spectrum, Vivid-24, Rainbow II, Rainbow III, Visiona Paint, Merlin, Retina, Piccolo, and EGS110/24! ...and we're working on supporting even more!

Like ALL of the emulation modules that will be released for use with the EMPLANT hardware, the Macintosh emulation module **MULTITASKS** with the Amiga's operating system! You can simply pull down or flip screens and get back to the Amiga side! ...and the emulation stays running at full speed!

Future Emulation Modules

Since the EMPLANT's hardware is so versatile, a completely new and different computer can be emulated by just changing the emulation software patch and the ROM(s). IBM 486DX, Atari 400/800, and Apple II+/e emulations are in beta testing now! Atari ST, and C64/128 emulations are planned for the future! You need no additional hardware for future emulation modules. All necessary hardware is already built into the EMPLANT board!

Four different versions of EMPLANT are available, ranging in price from $279.95 to $399.95. Order direct from Utilities Unlimited Intl., Inc. or from one of our dealers (more than 200 dealers across the US and overseas carry EMPLANT). US customers, please include $10 for shipping/handling (all packages are sent UPS 2 day delivery). Non-US customers, please contact Blittersoft: +44 0908 666265 for the dealer nearest you.
Dealer inquires are welcome!

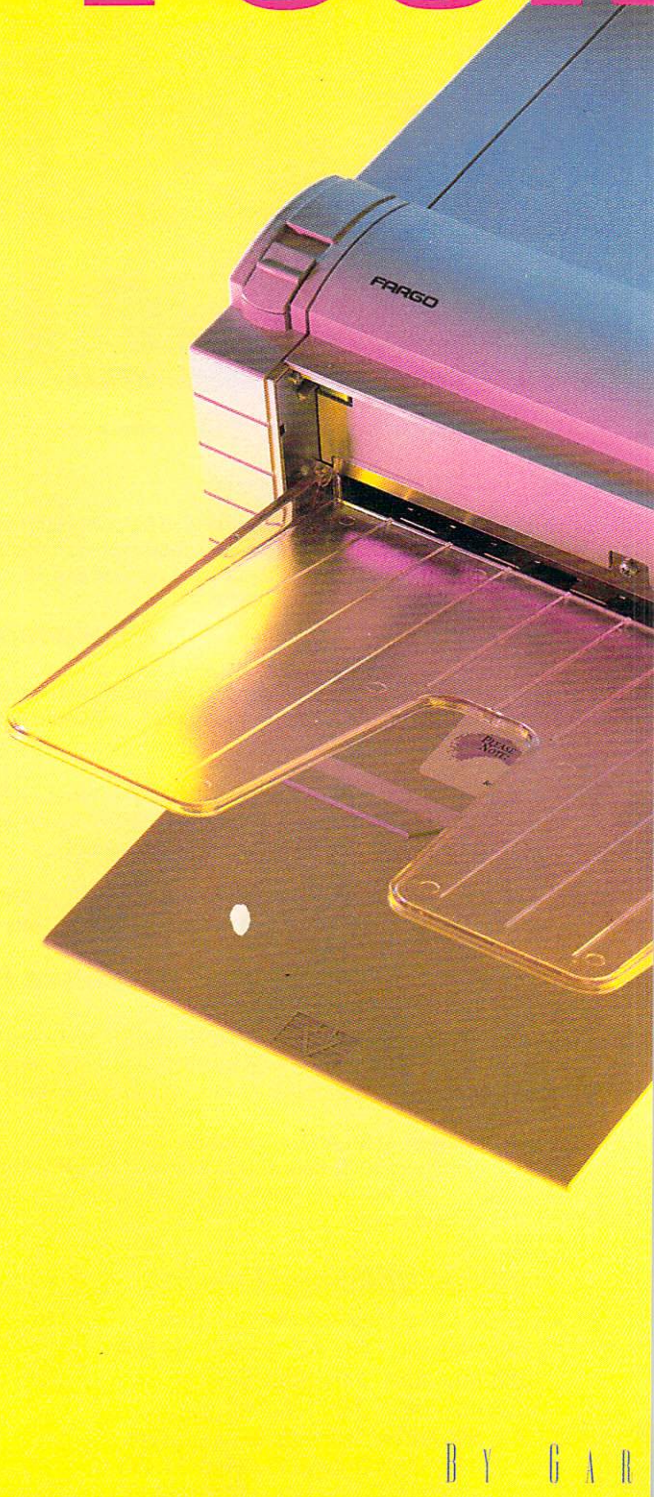
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(602) 453-9767 24hr BBS (2400-14.4K)
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Compare these features with 'other' Macintosh emulators:

- Hardware level ASC (Apple Sound Chip) 8 bit stereo sound emulation.
- Direct access file transfer capabilities.
- Static memory allocation (protects emulation's memory from fragmentation).
- Built in SCSI interface option.
- Amiga I/O drivers for serial ports and SCSI interface.
- Text and graphics clipboard sharing (cut 'n' paste between emulations).
- Built in audio digitizer.
- 24 bit and 32 bit modes available, supporting System 6.0.2 to present.
- Free software updates (available through our 24hr BBS).
- MULTIPLE EMULATION CAPABILITY!
- And much, much more!

Circle 159 on Reader Service card.

SHOW YOUR



If you're looking for tranquil seas in the computer market, steer clear of the body of water marked "Color Printers." But if you're the adventurous sort, and you're ready for some exciting new developments (at some equally exciting prices), that's exactly the course you should be plotting.

Just a little more than a year ago, you had only two choices: clunky, dot-matrix printers—cobbled up with color ribbons—and the less-than-wonderful Hewlett-Packard 500C—whose three-color printing process for graphics was merely okay at best.

HURRICANE WARNING!

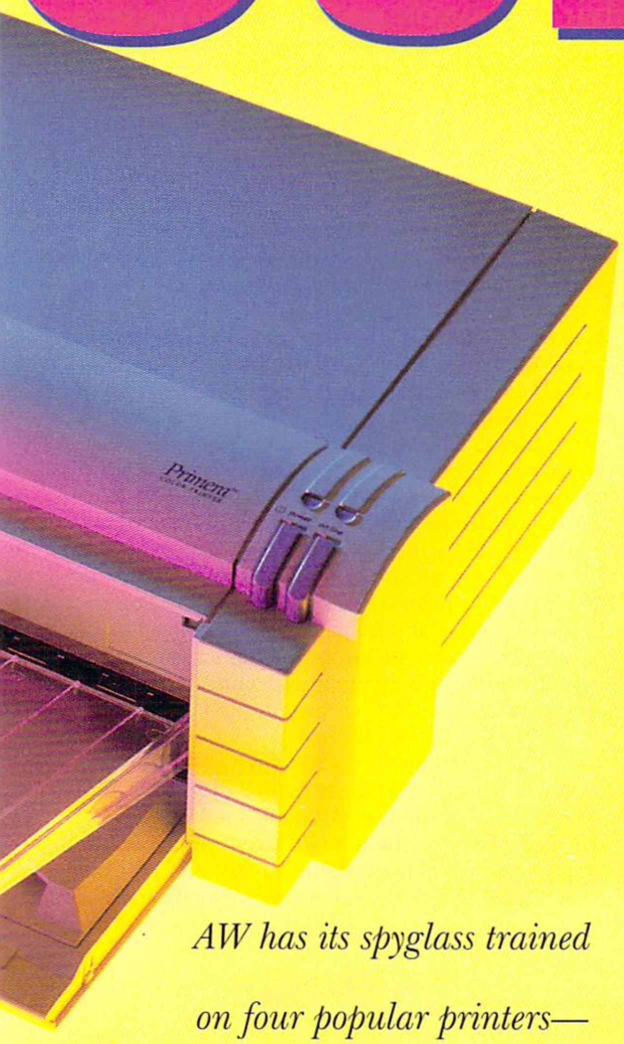
Over the last year, however, the field has exploded. First, HP introduced its four-color DeskJet 550C, pushing the street price of the DeskJet 500C under the $500 mark. Then Canon brought color to its BubbleJet line, first with the larger BJC-800, and more recently with the BJC-600. The war was on! HP responded a few months ago with the 1200C—a faster 550C with a PostScript option. (And as this article was going to press, HP also announced its 560C—pushing the 550C's street price down to the $500 level—but more on that later.)

Most recently, a new technology (new to the under-$1000 category, that is), thermal-wax transfer, was introduced by both Star Micronics (the SJ-144) and Fargo (the Primera). Fargo, however, really stood the printer market on its ear with the announcement of a Primera model (at a little over $1000) sporting a dye-sublimation

BY GAR

 PHOTOGRAPHED BY ED JUDICE

Colors!



AW has its spyglass trained on four popular printers—all under $1000—to find out just how seaworthy each one is when it comes to handling your color printing needs.

UDWICK

printing option—a high-quality color printing technology that before now was available only on very high-end machines with base prices beginning in the $8000–$10,000 range!

So, from dead calm to hurricane force, the winds of change have swept the color-printer market—leaving you plenty of options to choose from. But profusion has brought confusion, too, and that's why a comprehensive comparison of current offerings is in order.

Compass Settings

For our purposes, we'll be comparing four basic models (with some options): HP's DeskJet 550C, Canon's BJC-600, Fargo's Primera, and Star's SJ-144. In addition to the descriptions in the main text, features and functions of the four printers are presented in a comparison chart. Also, we've conducted a print-quality comparison test using a specially selected set of three images ("Two Macaws" and "Girl in Red" from Kodak's CD-ROM image sampler and the DeluxePaint "Color Wheel"). Results are displayed in a sidebar.

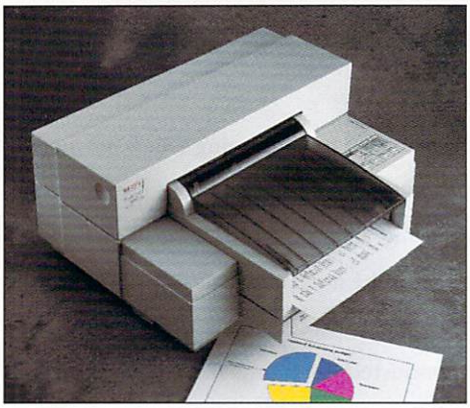
Manufacturers' suggested retail prices are presented for each printer, but I've also included fairly representative street prices in each of the write-ups in the main text to help give you a better idea of the actual amount you're likely to pay if you shop around. *(To contact the developers of any product covered in this article, consult the "Manufacturers'/Distributors' Addresses" list on p. 94.)* ►

HP DeskJet 550C

ALTHOUGH NOT REALLY that old, Hewlett-Packard's DeskJet is the printer that introduced inkjet printing, and it has already been through more reincarnations than Shirley MacLaine. Currently there are three models supporting color printing (with a fourth just announced as this article wwas going to press): the 500C ($485), an example of the older three-color technology; the 550C ($719), offering true four-color printing; and the 1200C ($1839), essentially a 550C on steroids that prints faster and offers PostScript as an option. HP's 560C reportedly will offer 600x300 resolution when it starts shipping in the near future.

With a street price of about $500, the DJ 550C is a good choice for those who want very good text output, and the ability to have four-color printing available on demand. With the 550C, like most inexpensive color printers, you can expect banding artifacts from time to time, and occasional striping, although the latter is usually a sign of a clogged nozzle or low ink supply.

Paper choice has always been a critical factor in inkjet printing—especially with four-color work. The 550C is no exception. On common copy paper you might get by with black text, but not with color. On the other hand, HP's clay-coated glossy paper (the LX Jet Series) can easily cost more than a dollar per sheet. A nice middle ground is paper such as Hammermill's Laser Print or Laser Plus, which feature a smooth, milled surface and exceptional whiteness.



HP DeskJet 550C



Canon BJC-600

But on anything less than HP's two papers (the LX Jet and the dull-surface CX Jet Series at about 11 cents a page), be prepared. The 550C can lay down a lot of liquid, and most color prints show it with intensive paper wrinkling and color bleeding—not exactly what you want to see in an important business presentation.

Generally the DeskJet 550C held its own in our test comparison. Colors were pleasing and well saturated, but often on the muddy side. With our three test images, the 550C did its best work on the color wheel, handling the difference between the dark green background and the lighter green wedge better than the BJC-600. It didn't perform nearly as well on the photo scans, however. Text quality was good, but not exceptional, with some ink overspray apparent.

One other point favoring the 550C is its reputation as the Clydesdale of printers. Well built and mechanically refined over the years, HP's DeskJet 550C provides a three-year warranty—at least one year longer than any other printer we looked at.

Canon BJC-600

WITH THE CANON BubbleJet series, you see a departure from HP's approach to color inkjet printing. With the DeskJet, every time you load a new ink cartridge you get a new print head. With the BJC-600 ($719)—and the BJC-800 ($1699)—inks are piped to a separate print head. Where HP uses one cartridge containing the C-M-Y (cyan-magenta-yellow) inks and one black (K) cartridge, Canon uses four separate color ink carts. And where the HP technology uses heat to force a spray from a print-head nozzle, the Canon's BubbleJet method more politely forms a micro bubble that is transferred to paper.

As your momma used to say, "politeness pays": Canon's BubbleJet technology, coupled with a better 360x360 resolution, give the BJC-600 the nod when it comes to black text output. The characters are simply better formed, sharper, and exhibit less "overspray" than HP's DJ 550C.

On the color side, Canon wins out again. The BJC-600 was less prone to banding than the 550C, produced less severe wrinkling with plain paper, and its color accuracy on our scanned photographs was better overall. While its prints were sometimes a little on the "contrasty" side—due I suspect to an enhanced black mode it uses in color printing—its higher resolution, seemingly better dye formulations, and 64 dots per head all made a major difference in the final tally.

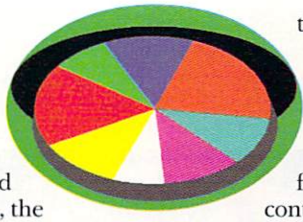
There's a lot to like about the BJC-600: good quality on plain paper, separate ink cartridges, quiet printing, 64-dot print head, and even its downloadable font capability. And while the BJC-600's street price of about $600 commands a $100 premium over the 550C, its superior output, significantly lower cost per page, and other special features may well make it worth the additional cost to demanding users.

Fargo Primera

THE BIG BUZZ in the Amiga community over the last few months concerns the Fargo Primera (pictured in the opening illustration). Why the interest?

Well, the Primera is a thermal-wax-transfer printer, which puts it into a printing category with Tektronix ($3700) and Calcomp ($9000). This is a color-printing process known for its quality, and one favored by many service bureaus. But the Primera's list price is $995 (with a street price as low as $700)!

The price alone would get people's attention, but there's more. For an additional $250, the printer can output dye-sublimation, near-photographic quality prints—which puts it into a category of printers costing $8000-$10,000 or more. And if you have the right software, you can have the dye-sub option almost free (see further on in this section).



Now, how did Fargo do all that?

Until now, every wax-transfer or dye-sublimation printer was really a computer with a printer attached. The image processing, controller, and language features (such as PostScript) were all handled by the printer's onboard computer. Fargo eliminated that. Instead, the image processing is done on your computer. There's no printer-language support and almost nothing in the way of built-in fonts.

Many of those features, however, are unnecessary for Amiga users. Much of our software sends data to the printer in the form of a graphics file, anyway. Our custom chips and processors were designed for graphics processing. This makes the Primera and the Amiga a near-perfect marriage.

So, how does it work? Great. Thermal-wax printouts are brilliant, with very good color rendition. There's almost no banding because the printer lays down its images through page-sized ribbon panels, one color at a time. This nearly eliminates artifacts, unless your choice of dither patterns creates them. Fargo offers both three- and four-color ribbons. In our tests, the three-color prints were very good, whereas the four-color prints showed more contrast, accentuating the dither pattern. Because the Primera prints at a resolution of 203x203 dpi, scanned images appear slightly soft, but computer-rendered graphics look fine.

SUBLIME SUBLIMATION

Dye-sublimation prints are even more amazing. They do achieve near-photographic quality. Are they perfect? No, but they're close. Depending on the subject matter, you'll sometimes detect slight streaks or unevenness in the color. And again, the overall result is slightly soft in appearance. But show the Primera's dye-sub prints to friends, and I bet most will think they came from a color lab.

To put the Primera's achievement in perspective, keep this in mind: To move from 203 dpi to 300 dpi will cost you approximately $8000!

A few caveats: You'll need a good supply of memory, or more than just a few megs of free storage space on your hard drive. Primera's first step, after you hit the print button, is to perform color separations on your graphic image (a process also known as Raster Image Processing). That means you have four large graphics files that will probably need to be stored somewhere temporarily until the process is complete and they can be dumped to the printer. With Fargo's driver you could need as much as 6MB of space.

Second, the Primera's ribbons and paper material are very susceptible to dust, which shows up as tiny colored pinholes in your print-outs. Look carefully at the samples accompanying this article and you'll see a few that crept in.

If there's a weak link in the Primera's system, it has to be the Amiga printer driver. The problem is that it provides you with no way to manipulate or color-correct your images. A machine with output this good just simply has to have such controls.

As is often the case with printer snags, Wolf Faust was the first to supply a third-party driver for the Primera. Based on his widely hailed Studio printing program, Faust's StudioDS printing interface (soon to be available through MacroSystemUS) solves several of the Primera's problems: Faust's program uses minimal memory to accomplish the separation process, and there's a loader module that can interpret a variety of graphics-file formats; in addition, his fully developed interface gives complete control over every aspect of the final printout. You can even create wall-size murals with StudioDS.

Another Primera problem has also been fixed recently. Initially, ASDG's popular image-processing program, Art Department Professional, couldn't take advantage of the Fargo Primera's dye-sub process. ASDG, however, has rectified that situation with its just-released ADPro 2.5 ($299). Not only does the program offer full image processing and 24-bit output to Primera users, but ASDG (as well as Faust and also GVP for its ImageFX—$429) have licensed the software that controls the dye-sublimation features. All three now include it in their products, which means the dye-sublimation upgrade is built into these programs. All you have to do is buy the paper and ribbon from Fargo, and you're ready to go—at a savings of nearly $200!

One Primera weak point that no one has addressed, though, is the quality of its printed text. Primera's 203-dpi resolution, coupled with the bitmapped nature of the process, gives text the slightly jagged look we used to see in word processing. It's not terribly bad, but it's not reproduction quality or even up to the level we've come to expect from programs such as Final Copy (SoftWood).

Apart from that, however, if you want high-quality, near-photographic color image output, there is nothing even close to the Primera on the market today—neither in image quality nor in value.

Star SJ-144

THE STAR SJ-144 ($599) had the potential to be the big surprise of our head-to-head competition. Technically, the machine is a dye-transfer unit; it uses a four-color ribbon cartridge that transfers a polyester dye via a heated 144-element head. Its per-print cost is low (see table below); its street price of around $500 is very competitive; it has the largest onboard memory of the bunch; and it's quick, quiet, and lighter than some laptop computers. Best of all is its black and text output. Star likens it to laser quality, but I'll go one step further: It's the best I've seen since the IBM Selectric with film ribbons disappeared. Laser, in my opinion, still hasn't surpassed that combination for quality text output.

The SJ-144 has just one problem: It doesn't handle scanned images and large color areas ►



Star SJ-144

PRINTER TEST COMPARISONS

NOT HAVING OUR own testing labs, like some of those mega-size PC publications, we tried to approach our printer comparison with common sense, rather than electronic measuring devices.

The computer we used was an Amiga 1200 with 4MB of RAM and a SCSI interface. It was not accelerated. No special graphics boards were utilized.

Hold The Variables

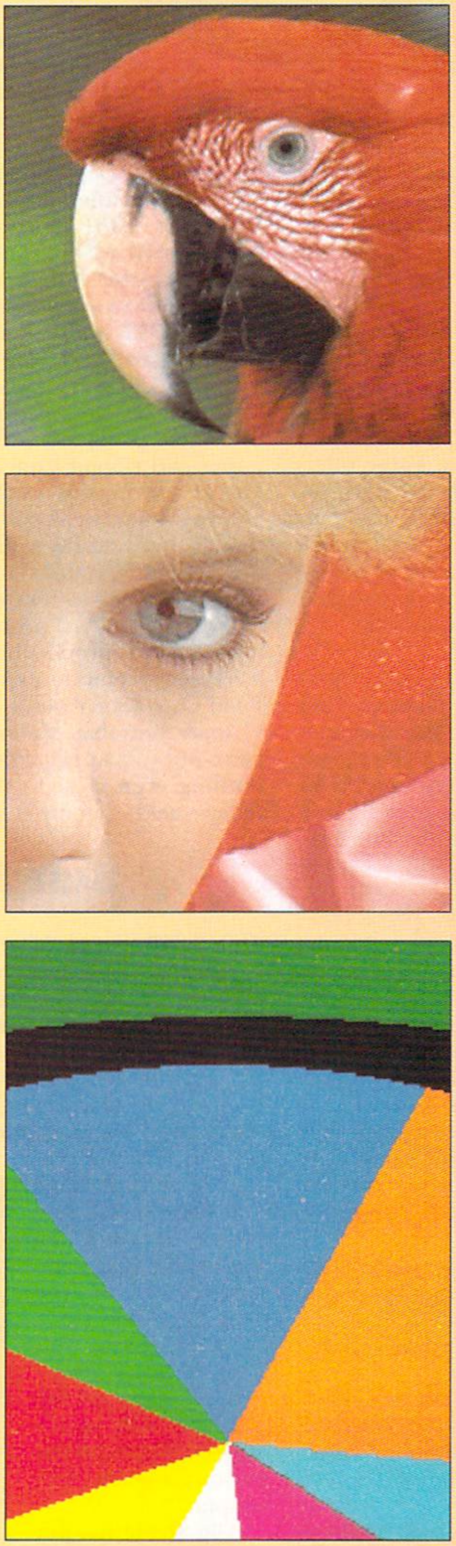
In order to eliminate as many variables as possible, we standardized our tests in certain ways. All printer drivers were provided by Wolf Faust. Wolf resides in Frankfurt, Germany, and it is indeed one of the benefits of our international electronic highway that Wolf and I were able to "talk" with one another nearly every evening on CompuServe. Wolf has been most generous with his time, his advice, and, most importantly, his excellent Studio packages of drivers and printing interfaces for the Amiga computer.

Paper was another variable. Our inkjet tests were limited to three papers: Hammermill Laser Print, for plain paper testing; Hewlett-Packard CX Jet Series, dull surface.; and HP LX Jet Series glossy paper. Primera printouts employed both the special papers provided in the Fargo kit and the Hammermill Laser.

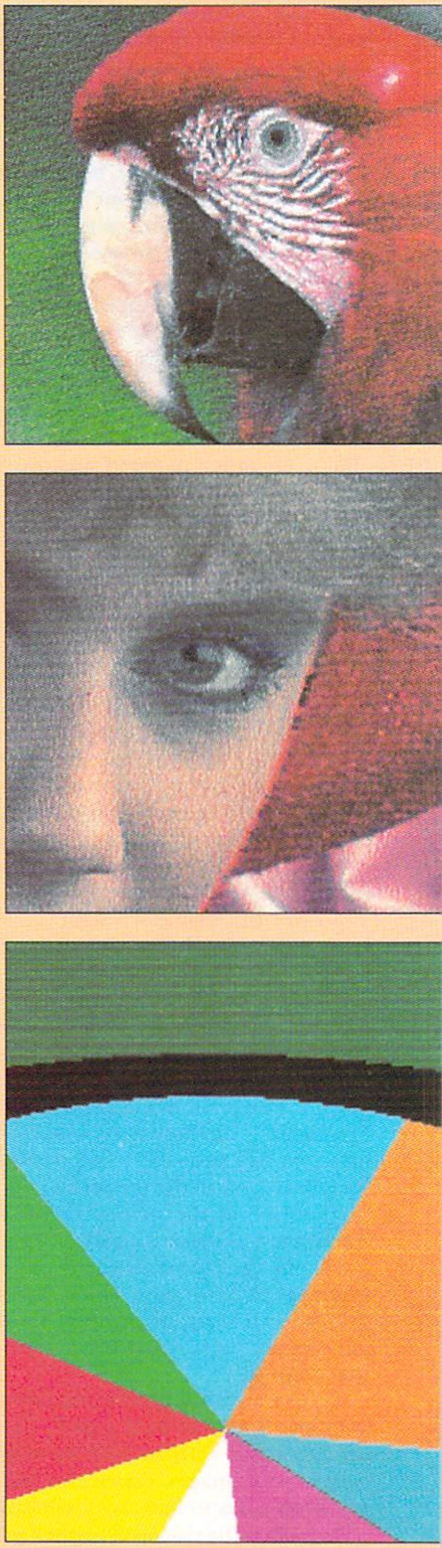
In the best of all worlds, we would have space to reproduce a test from each kind of paper for each of our test images. Unfortunately, that was not possible. Therefore, we have chosen the best-looking output for reproduction, regardless of which paper it was printed on. For the inkjets that was usually the HP CX Jet Series paper. Even though much less expensive than the LX glossy paper, it almost always provided superior images. The LX Jet tended to overemphasize the image's dither patterns, giving our test images a much grainier look.

Testing! Testing!

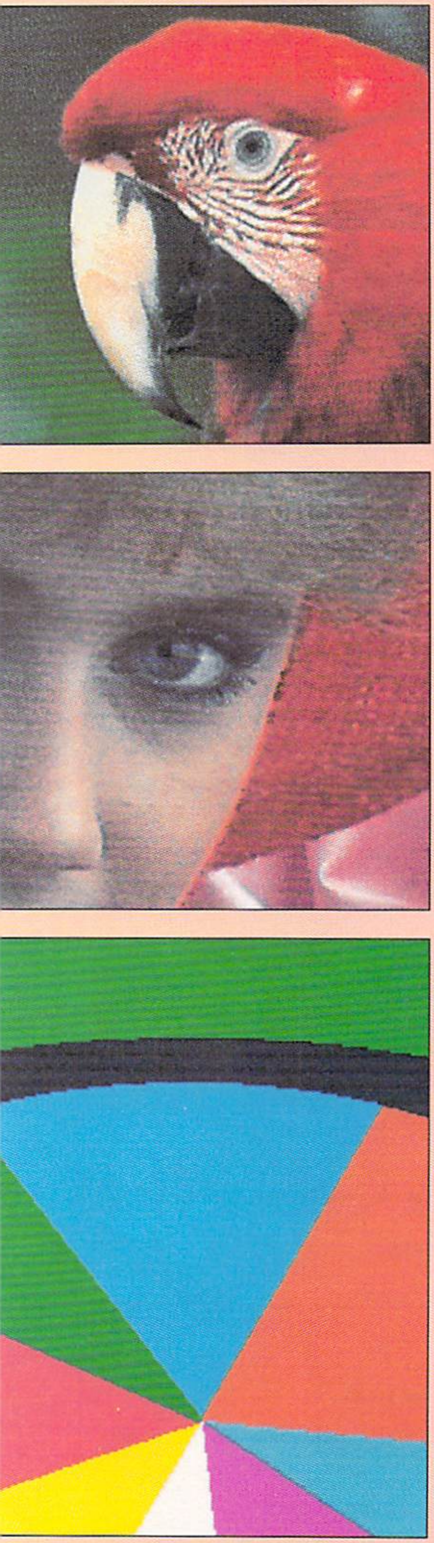
The test images are from Kodak's CD-ROM image sampler. These were JPEG-compressed at 90% through ImageFX and downloaded from CompuServe. (The JPEG image files themselves are included in the oval insets.) Using Viewtek, we then converted them to 768x512 HAM8 images for printing. Images for the Primera were printed directly from the JPEG files since both ADPro 2.5 and StudioDS provide built-in readers for such image formats. For that reason, you may notice some change in aspect ratios between otherwise identical images. Viewtek and the other programs mentioned interpret the aspect data differently. A special clip-art image, "Tiger," from the Final Writer (SoftWood) package was used with the Star SJ-144 in place of the "Girl in Red" image to



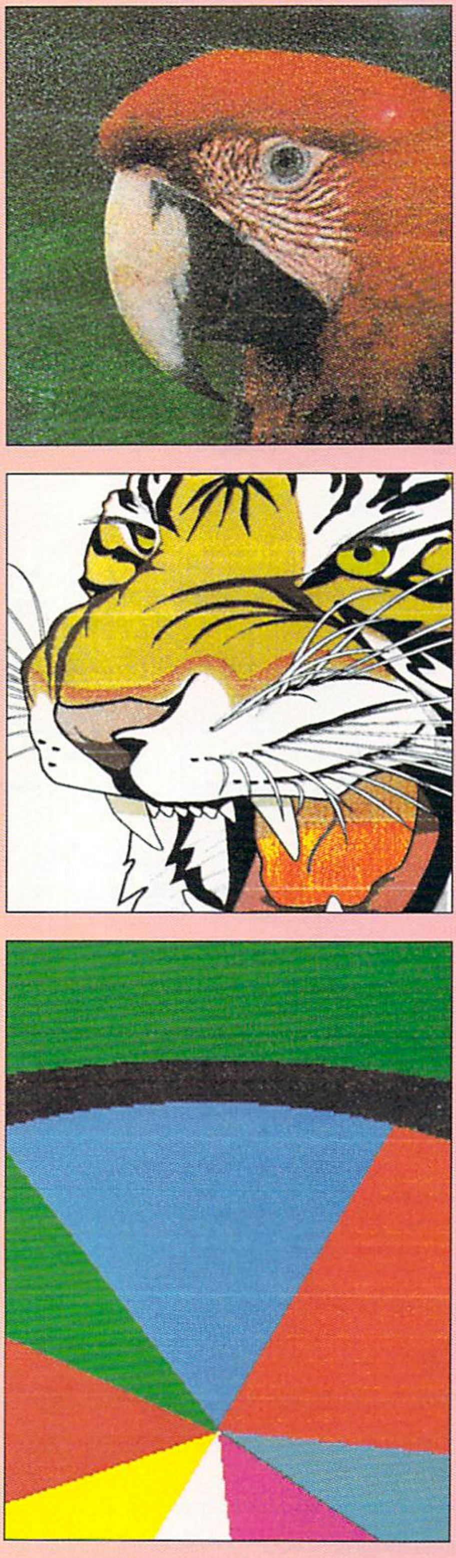
Fargo Primera



HP 550C



Canon BJC-600



Star SJ-144

illustrate its abilities with such images and with spot color.

The test images were chosen specifically for several reasons. Steve Kelly's "Two Macaws" represents highly saturated colors, strong contrasts, and a wide dynamic range. Bob Clemens' "Girl in Red," on the other hand, features low contrast, subtle color range, and large areas of fleshtone. The DPaint "Color Wheel" was rendered to check how the printers handled the solid color blocks often found in business-presentation graphics. It was also created to check how well printers handled closely related colors, such as blue and teal or dark green and yellow green.

No Text Please!

Text samples were not included in our printouts here because (1) we were primarily interested in color-graphics output, and (2) unless we were to enlarge the type samples by huge amounts, the subtle differences would be lost in reproduction. In addition, the magnification process exaggerates any inherent problems (and creates an equally false impression).

It certainly was not a perfect test, by any means, but I hope the results are useful in the real world of graphics printing—and in the hard decisions one must make in choosing an expensive printer. *—GL*



Keeping in mind that "pleasing color" is an extremely subjective and personal thing, compare these printouts with the oval originals scattered throughout the text. Look for banding—uneven swatches of color from top to bottom; white or colored stripes through the picture; loss of subtle shading; added textures or artifacts; overemphasis or deemphasis of certain colors (reds and blues, especially). Also, realize that, given enough time, paper, and ink, every one of these samples could be improved. ►

well. Although it has an excellent built-in adjustment program for reducing banding and white or black lines, the print head does not seem up to the task when faced with large color areas. In addition to needing exact physical alignment (which the built-in program has), the head in a dye- or wax-transfer printer also

Color Printers: Feature Comparison

Printer	DeskJet 550C	BJC-600	Primera	SJ-144
Manufacturer	***Hewlett-Packard***	***Canon***	***Fargo***	***Star Micronics***
List Price[1]	$719	$719	$995[2]	$599
Print Method	inkjet	inkjet	thermal wax; dye sub	thermal polyester dye
Physical Characteristics				
Dimensions (HxWxD in inches)	8.2x17.5x15.3	6.8x13.7x7.6[3]	5.8x13.8x10.2	6.9x12.8x5.5[3]
Weight (pounds)	14.5	9.9	15	5.5
Number of jets	50 black, 16 color	64	n/a	n/a
Installed Memory	80K	60K	0K	176K
Interface	serial & parallel	parallel	parallel	parallel
Resolution (dots per inch)	300x300	360x360	203x203	360x360
Paper Handling				
Maximum Paper Size (inches)	8.5x14	8.5x14	8.5x11	9.5x14
Maximum Paper Weight	36 pound	28 pound	n/a	card stock
Item Type Printed				
Cards?	No	No	No	Yes
Overhead Transparencies?	Yes	Yes	Yes	Yes
Envelopes?	Yes	Yes	Yes	Yes
Landscape Mode?	Yes	Yes	Yes	Yes
Paper Path(s)	lower front	top rear	lower front	rear top/rear bottom/ lower front
Other				
Manufacturer's Rated Speed[4]	HQ,10 cpi: 167 cps	HQ,10 cpi: 170 cps	2.5 min/page with dye sub	10 cpi: 255 cps
Average Print Time (minutes)[5]				
Macaws	17–19	16–18.5	19–20.5 wax 18–21 dye sub	14.5–18
Color Wheel	7–9.5	6–8.5	4.5–12 wax 7.5–16 dye sub	5–7.75
Warranty	3 years	2 years	1 year	2 years

Notes:

1 Price considerations do not stop with the hardware itself; the cost of ribbons and paper also differ. Here are the consumables you can choose from for each printer and their suggested list prices:
DeskJet 550C: Color cartridge ($34.95), Black-Hi Cap ($31.95), 200 CX paper ($21.95), 50 LX gloss paper ($60).
BJC 600: All cartridges $8.00.
Primera: 3-color wax ribbon ($45), 4-color wax ribbon ($45), 25-print dye-sub print kit ($90), 100-print dye-sub kit ($280). Dye-sublimation refill kits come complete with ribbon and special paper.
SJ-144: 3-pack of 4-color ribbons ($22.50).

2 The standard thermal wax transfer model lists for $995. The model with the dye-sublimation option goes for $1245.

3 Both the BJC-600 and the SJ-144 use vertical paper feeds, which increases their height factor when the paper support is pulled up. Users with pull-out printer shelves or drawers may have clearance problems.

4 HQ = high-quality print mode; cpi = characters per inch; cps = characters per second.

5 The range of average printing times represents the effect that various dithering methods can have upon output. Only the dither patterns were changed. Lower numbers represent an Ordered 16 pattern; higher numbers represent more complicated patterns such as Blue Noise 30% & Stuki.



needs perfectly even temperature from one side of the head to the other.

And that seems to be the SJ-144's problem. If one end of the head is slightly cooler than the other (or slightly hotter), the density of the color is changed, resulting in a slightly lighter or darker color density under that section of head. In our tests, the Star would often start off a print fine, then a third of the way through it would begin putting down slightly lighter areas of color near one end of the head—resulting in a banded appearance. Occasionally, one end of the head would print darker and the other end lighter on the same pass, giving what I call a closed venetian-blind effect.

Star representatives say that the printer wasn't designed for scanned images and big blocks of color. That's why we didn't even include an output example in the "Girl in Red" test. Instead, we tried it on the kind of spot colored clip art you might use in desktop publishing (see the "Tiger" print in the test sidebar) with excellent results. Unlike the Primera, which puts down a glossy wax image, the SJ-144 uses a dull finish film, and on plain paper the output really looks good.

For desktop publishing—with smaller areas of spot color and pure text output—the Star SJ-144 might very well be your best bet. Although not reflected in our comparison chart, there is a black-only ribbon available for it that will give you a 180 pages of text for less than four cents a page, making its text-only output the best and cheapest in our comparison.

The Real Cost of Color Printing

TRYING TO COMPUTE the cost of color printing is a difficult task because there are no standards. Often the manufacturer's specs are of little help, mainly because lab specs don't represent real-life printing situations. This is especially true with inkjets.

On the other hand, printers using sheet ribbons, such as the SJ-144 and Primera, have a fixed number of four-color sets. Divide the cost of the ribbon by the number of panel sets, and you have the cost per print. It's even easier with the Primera dye-sub model since you buy refill sets that include both paper and ribbon.

I have seen per-page costs for color inkjets ranging from $0.05 to $1.61. You might get a page of black text for a nickel, but you won't get a page of four-color for $1.61. With HP's 550C, before you make the first print or buy the first sheet of paper, you have made an investment of $57 for just two ink carts. With the Canon BJ-600 the investment is less: four carts at $8 each. But with either one, your cost per page is going to be higher than you might guess.

An independent research study by RIT Research Corp. (Rochester Institute of Technology, Rochester, New York) provided the cost per-page data (above) on the 550C. The Star SJ-144 and Fargo Primera data are based on retail pricing of their ribbon/paper refill kits. Note that the 550C and the SJ-144 examples do not include paper/media costs.

While the BJC-600 was not part of the RIT research, we have reached some admittedly non-scientific conclusions about it. Canon-supplied data suggests it can provide 203 pages at 10% coverage, 40.5 at 50%, and 20 at 100%. With a cartridge cost of $32, full-coverage cost per page is $1.60—over 30% less than the 550C. My limited experience with it supports the premise that the BJC-600 provides more full-page printouts per set of carts, and thus, the cost per page is lower (20–30% lower might be a more realistic range). But, as in new-car mileage claims, "Information provided for comparison only—your mileage may vary."

COST PER PRINT COMPARISONS

Printer	Percent of Coverage/Number of Pages 25%	50%	100%
550C	$0.72/28	$1.44/14	$2.88/7
SJ-144	$0.24/32	$0.47/16	$0.94/8
Primera (dye-sub)	n/a*	n/a*	$3.60/25
Primera (wax-transfer)			
Three-color	n/a*	n/a*	$0.39/115
Four-color	n/a*	n/a*	$0.45/80

* Partial coverages not applicable to Primera. Regardless of coverage, per-page cost remains the same. Page coverage defined as full 8.5-inch width by the percentage of 11 inches vertical.

THE FINAL PRINTOUT

After living with these four printers for nearly six weeks, I have come to one conclusion: There is still no perfect, one-size-fits-all printer. Each has its strengths and weaknesses, and as of today, it would probably take at least two of the above to cover the gamut of printing needs well.

With inkjets, there's no question that the Canon BJC-600 is the top performer. It outperforms the 550C in almost every category—sometimes by a lot, sometimes just a little. Even though the street price of the BJC-600 is $100 higher than that of the 550C, its overall higher quality output and lower cost per page make it our recommended inkjet.

Like the Primera, the Star SJ-144 tends to be somewhat specialized in its potential appeal to Amiga owners. Its inability to handle large color graphics without noticeable and objectionable banding is definitely a minus. On the other hand, not everyone needs that capability, and it is the best text printer in the group both in terms of quality and cost per page. If high-quality text is your primary need—with clip art, line graphics, and spot color as only a secondary priority—the SJ-144 is the best choice.

The Fargo Primera is exceptional. Nothing comes close to it in terms of color-graphics output, and its wax-transfer prints win the cost-per-page sweepstakes hands down. Unfortunately, unless there is some way to upgrade its text-handling abilities, it will stay categorized as a graphics specialty printer . . . but a damn good one! Pair it with a black-only HP 500 or Canon BJ-200, and you would have an unbeatable combination for text and graphics. If this weakness can be overcome, we'll be much closer to that one perfect, all-purpose printer everyone lusts after. ■

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Hidden AmigaDOS Gems

Our three-part miniseries on mining the secrets of the Amiga's new operating system concludes with a look at how AmigaDOS can enhance your printing potential.

Part 3: Printer Power

WHEN YOU THINK about printing from your Amiga, you probably don't consider using the Shell. After all, you can usually take care of all your printing tasks by means of your applications programs. There are cases, however, when printing operations can be handled faster, easier, and sometimes better via the Shell. If you're willing to learn a few AmigaDOS commands, you can give your Amiga new printing prowess.

PRINT BASICS

First, a quick review of the basics of controlling the printer from the Shell. As you may know already, you can print plain text files directly from the Shell without loading a word processor. If you want to print a single file, say, one called README.1ST, simply type one of the following commands:

```
COPY README.1ST PRT:
TYPE >PRT: README.1ST
PRINTFILES README.1ST
```

The last choice, Printfiles, is a little-known command that resides in the Tools directory. (Floppy users will find it on their Extras disk.) Printfiles offers an additional advantage to users wishing to print multiple documents. If you use its form-feed option, -f, preceding each filename, the printer will eject the page after printing that file. Here's an example of printing multiple files with form-feeds after each file:

```
PRINTFILES -f SPAM.C -f SPAM.H -f SPAM.DOC
```

Note that you should not use any of these commands to print files saved in anything but plain ASCII text format; trying to print files in a word processor's native format will produce extraneous garbage characters.

When you send a file to the printer using the Copy or Type command, the printer won't eject the last page of your printout. Rather than hitting your printer's form-feed switch, simply send an eject code, Ctrl-L, to the printer. You can insert this at the end of the file if your text editor allows control characters. The ED editor included with AmigaDOS doesn't, however, so the best work-around is to create a new script command called FF that will eject your printer's page. To create the command, type the following sequence of commands, holding down the Ctrl key and hitting L where you see Ctrl-L:

```
COPY * TO S:FF
ECHO >PRT: "Ctrl-L"
```

Press Return and type Ctrl-\ to terminate the copy command. Now type

```
PROTECT S:FF +S
```

to make the script command executable. Now you can just type FF at the Shell prompt whenever you want to eject a page.

TAKING "CMD" OF YOUR PRINTER

When it comes to printing, the diamond of all the AmigaDOS gems is the CMD command. Found in the Tools directory, this command grabs any data that would normally go to the printer and stores it in a file, instead. (The name comes from the CMD statement in Commodore's old eight-bit BASIC, which was used when you wanted to redirect output to the printer or disk drive.) There are a multitude of uses for CMD; files created by it can be copied to your printer or even taken to another computer to be printed.

CMD is activated before you choose the print function in your application. To have CMD intercept a printout and store it in a file called PRINTOUT on the RAM disk, type

```
RUN CMD PARALLEL RAM:PRINTOUT
```

(Substitute SERIAL for PARALLEL if your printer is attached to your Amiga's RS-232 serial port.) This will cause the next document you print to be sent to a file instead. If you want CMD to intercept every file you print from that point on, use the m option to specify multiple files.

```
RUN CMD PARALLEL RAM:PRINTOUT OPT m
```

Note that the m must be lowercase for this to work. Each file you print will be stored on the RAM disk, with a

BY DENNY ATKIN

ILLUSTRATED BY FRED LYNCH

number appended to it: PRINTOUT.1, PRINTOUT.2, and so on.

If you've installed CMD for multiple files, remember to disable it before attempting to get an actual paper printout. To disable CMD, type STATUS and find the process number for CMD, then use the Break command to remove CMD. For instance, if the Status command returns the result

Process 6: Loaded as command:
SYS:Tools/CMD

you would type BREAK 6 to disable CMD.

To print a CMD output file, simply copy it to the PRT: device. For instance, you might type

COPY RAM:PRINTOUT.3 TO PRT:

There are many situations where printing a CMD-generated file is a better option than printing directly from your application. If you print multiple copies of the same document, you can speed printing of complex documents dramatically by using CMD. Unless you have a slow dot-matrix printer, or a very fast Amiga, it's likely that your printer can output the page faster than the Amiga can "rasterize" it (translate it into a graphic image in printer format), and thus the printer is spending a fair amount of time just waiting for data from the computer. Using CMD, the Amiga only has to rasterize the document once. Simply using the Copy command, you can now send the output directly to the printer, where it will print at the printer's top speed. You can take advantage of the Amiga's type-ahead capability to make issuing the multiple Copy commands easy. Type the full Copy command, hit Return, and the printer will start working. Now press the cursor-up key to recall the command you just typed, and hit Return again. Repeat for as many copies as you need. (ARexx-savvy users could easily construct a simple macro that uses the Do command to make as many printouts as needed.)

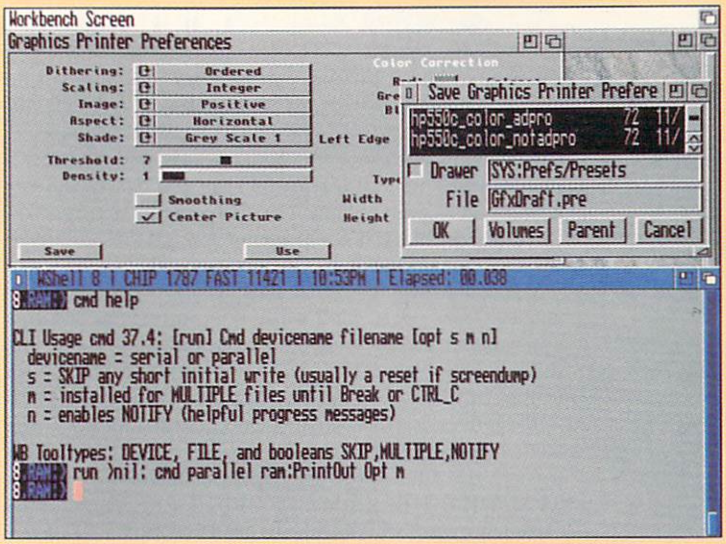
Amiga Esperanto

Since there's nothing that says that a file must be printed from the computer it was created on, using CMD to save your printout as a file offers yet another advantage. If you don't have a printer, or you'd rather use a printer connected to another computer, you can just copy the file to a floppy disk and take that file to another computer for printing.

Printing larger documents, though, especially those containing graphics, may result in CMD files that are too large to fit on a floppy. Printer files, however, contain lots of repeating patterns, so they compress exceptionally well. Using a program such as the shareware LHA, you can often achieve 50 to 80 percent compression. LHA file extractors are available for both the PC and Macintosh, so compressing the files won't affect portability.

CMD stores files in the format used by the printer you have selected in Printer Preferences, so be sure to select the proper driver before printing. For example, if your file will be sent to a laser printer, you'll want to select the HP_LaserJet or PostScript driver before printing.

If you want to print your document on a printer connected to an MS-DOS machine or a Macintosh, you'll need to use CrossDOS to store the CMD-generated file on an MS-DOS format disk. (CrossDOS is included with AmigaDOS 2.1 and later, and is available as a stand-alone product from Consultron.) Just copy the file to PC0:, making sure all the CrossDOS file-translation options are disabled.



Via simple script commands, you can instantly move among your commonly used printer settings without having to load Preferences editors to alter the settings every time you want to make a change.

To print the file on an MS-DOS machine use the Copy command, as with the Amiga. You'll need to use the /B (Binary) option so that MS-DOS will know it's a binary file, rather than a plain ASCII text file. If you want to print a file called OUTPUT.3 on a disk in drive A:, you'd type

COPY A:\OUTPUT.3 LPT1 /B

If you have a Bridgeboard on your Amiga and you've added a PC parallel port card for printing from PC programs, you may find yourself constantly swapping the parallel cable between Amiga and PC ports, or fussing with a switchbox. But you can leave the parallel cable connected to the PC port and use CMD to capture your output to a file. Then use the AREAD command with the /B option to copy the file to the PC side, where it can then be printed using the Copy command above.

Printing the file on a Macintosh LaserWriter is a little more complicated. You'll need a SuperDrive-equipped Mac (all Macintoshes from the Mac Classic on use the 1.44MB SuperDrive), which can read IBM-format floppies. Select the PostScript printer driver (included with AmigaDOS 2.1 and later) on the Amiga and use CMD to create your output file. Use CrossDOS to copy that file to a 720K or 1.44MB MS-DOS format floppy. Take the disk to the Macintosh and use Apple File Exchange to copy the file to the Mac's hard drive. Because the Mac has no command-line interface, there's no simple Copy command for moving the file to the printer. There are, however, a number of public-domain and shareware Macintosh programs available for copying PostScript files to a printer. One such utility is ShowPages, a tiny program that will print any PostScript or text file that you drag-and-drop onto its icon.

Quick Change

The Amiga's printing system is very flexible, offering a multitude of options for adjusting the final look of your ►

printouts. Although there are thousands of possible combinations of settings available, chances are you'll end up using perhaps two to four different combinations, such as color or mono, and final or draft quality. Instead of loading the Printer and PrinterGfx Preferences editors every time you want to change your settings, you can take advantage of the power of AmigaDOS and make the change with a single script command.

When loading a Preferences editor from the Shell, you can force it to load a file containing the settings you want to use and activate those settings without any further interaction from you—no more clicking on a wall of buttons to get everything just right.

First, decide which settings you use most often. Load each Preferences editor and use the Save As function to save the file under an appropriate name, such as TEXTDRAFT.PRE and GFXDRAFT.PRE. Repeat this for each group of commonly used settings.

Now, create a set of script files that load each group of settings. For example, to create a script file called PRTDRAFT that will set your printer to use the settings saved in the files mentioned above, type ED S:PRTDRAFT to load the AmigaDOS editor, and then type the following commands:

```
PRINTER FROM SYS:PREFS/PRESETS/TEXTDRAFT.PRE USE
PRINTERGFX FROM SYS:PREFS/PRESETS/GFXDRAFT.PRE USE
```

Press Esc, then X, and finally Return to save the file, and then type PROTECT S:PRTDRAFT to make the script file executable. Repeat this for the settings you created for final-quality printouts, perhaps calling the script PRTFINAL. Now you can adjust printer settings by simply typing the appropriate script command, a much quicker process than using the graphical Preferences editors.

EndShell

That wraps up our series on mining the secrets of AmigaDOS, but there are plenty of other treasures waiting to be excavated from your system disks. Don't limit yourself to using the Workbench to maintain your files—a little knowledge of Shell and script commands can make the most tedious file-maintenance operations simple and quick. And if you're having trouble finding particular treasures, let *AmigaWorld* know. Next month we'll be starting up a regular monthly column featuring tips on using the Amiga's operating system. ■

Denny Atkin is an editor and a freelance writer. He's the author of ***Denny Atkin's Best Amiga Tips and Secrets****, which contains handy tips on everything from using AmigaDOS 3.0 to expanding your Amiga system. Contact him c/o* ***AmigaWorld****, Editorial Dept., 80 Elm St., Peterborough, NH 03458 or at DennyAmiga@aol.com.*

The Best Things in Life Are...



Get to know the ubiquitous C language with the help of a programming pro. Part 1 of our two-part series explores the structure of C and starts you out with some examples.

In today's computer industry, C language is the favorite son. C gets all the best toys: compilers, support tools, cross-platform standards, and operating-system support. And, C gets to go almost everywhere: It is used for mainframes, supercomputers, embedded microcontrollers, digital signal processors, and personal computers—including the Amiga. Because the language and its set of basic system-interface routines are the same no matter which computer you're programming, code written for one system is easy to transport to another—as long as it isn't dependent on the operating-system specifics of a particular computer.

Much of the Amiga's operating system, in fact, was written in C, and Commodore provides C interfaces as a standard developer tool. Virtually all programmers' documentation and other resources consider C to be the primary language for the Amiga.

You can learn to program in C, and the Amiga can be your guide. (Back when I started, most computer users knew how to program, and most were self-taught.) Fear not, your Amiga is the best computer-language teacher available. Its patience is infinite, it never criticizes, and its feedback is nearly immediate.

Of course, you can't learn to program just by reading this article, any more ►

BY DAVE HAYNIE

ILLUSTRATED BY JOEL PETER JOHNSON

than you can learn to swim by reading about swimming. So read this through, but then read it again while you're sitting in front of your Amiga.

How C Works

The C language has always been implemented with compilers—an entire C program is translated into a system's native machine language, then run. So C executes much faster than BASIC, which has through most of its history been interpreted—the computer executes one instruction at a time. Unlike traditional BASIC and FORTRAN, the C Language is a "third-generation," or structured, language. It supports user-defined subprograms and data structures, as well as "goto-free" controls. And while mainframe languages such as COBOL are too large to be efficient on small computers, C is small enough to work well. Further, C was designed to support modular programming and is supported with a full-featured set of library routines (which is not true of other structured programming languages like Pascal). This means that a single C program can be written as several separate files, each of which can be compiled separately to produce a single final program. Modern C language and error-checking have also been standardized by the ANSI (American National Standard Institute) committee, a body that sets guidelines for language implementation.

While traditional BASIC has a programming "environment," C does not require one. You create a C program as a text file with any text editor, much as you would type an ASCII letter, AmigaDOS script, or ARexx file. This file is then processed by the C compiler, the program that translates C into an "object" program (that is, machine code with some of the high-level symbolic references retained). Another module, called a linker, combines one or more object files with any system-library routines necessary, and produces an output program called the "executable." The result works as a stand-alone program—it is pure machine code that will run on any Amiga without the C system or any other run-time support package installed.

Many AmigaDOS and applications programs, including the C development systems themselves, are produced this way. Most modern C language systems include an integrated text editor that can launch the compiler and linker, at least for simple programs. Many C packages include extra tools, generally for object-library or project management. (See "A Command of Languages," Aug. '93, p. 28, for details on the various languages and implementations.)

Hi C

Assuming you have a C compiler (see the "C Resources" sidebar), you can try a simple program. Let's just print "Hello, World" to an Amiga shell. This is enough of a program to ensure that the compiler is installed properly on the Amiga. The program is simply

Listing A.

```
/* TURTLE.C by Dave Haynie. This module provides a set of "turtle"
graphics routines designed to help make learning
C language fun and easy. In SAS C, build this with the line

sc math standard turtle

Other C compilers will need to select a math library; some do it by
default.*/

#include <exec/libraries.h>      /* Load data for the Amiga */
#include <clib/exec_protos.h>         /* Operating System */
#include <graphics/gfx.h>
#include <clib/graphics_protos.h>
#include <intuition/intuition.h>
#include <clib/intuition_protos.h>

#include <math.h>          /* Standard C definitions */

#include "turtle.h"      /* Load the turtle definitions */

/* This defines a pointer to an Intuition Window structure. */

static struct Window *window;

/* This is an unnamed user-defined structure, in this case representing
the turtle itself. */

static struct {
  int   heading;          /* Its heading, in degrees. */
  int   posX, posY;       /* X,Y position on-screen. */
  int   penstate;         /* What is the pen doing? */
} turtle;

/* The #define command creates an untyped symbolic name when used
in its simplest form. Such names are used to abstract constant values,
for easy changes in the future or, as in this case, to enhance the pro-
gram's readability. */

#define PEN_DOWN   0
#define PEN_UP     1
#define PEN_ERASE  2

/* This is an example of a "macro." It tests TRUE if the turtle is open,
FALSE if the turtle is closed. This is based on the state of the turtle's
window. */

#define TURTLE_OPEN( )      (window != NULL)

/* Variables necessary for the AmigaOS Intuition/Graphics system.
These are pointers to the "base" structure of the Graphics and Intuition
libraries. */

struct GfxBase    *GfxBase;
struct IntuitionBase    *IntuitionBase;

/* This code declares a variable, "turtlewindow," which is a
"NewWindow" structure (defined by intuition.h). This shows how a
structure can be initialized by the compiler in C if its contents are
known ahead of time. */

static struct NewWindow turtlewindow = {
  0,0,380,190,1,1,
  IDCMP_CLOSEWINDOW,
  WFLG_DRAGBAR|WFLG_DEPTHGADGET|WFLG_CLOSEGADGET,
  NULL,NULL,
  (char *)"Turtle Graphics Window,"
  NULL,NULL,
  40,40,0xffff,0xffff,
  WBENCHSCREEN
};
```

```
#include <stdio.h>

void main(void) {
   printf("Hello, World!\n");
}
```

This should be saved as a file called hello.c. It is pretty simple to understand: The first line loads information on a set of standard routines into the compiler when it's working. Unlike BASIC, which contains most of its routines at startup, a C compiler launches without knowledge of any subroutine. So-called "include" files tell the compiler about different data structures and subroutines. The stdio.h file is an ANSI standard C include, which is located in the system's public include directory.

The next line defines a subprogram, or function. A programmer can call a subprogram by any name, and the names can be at least 32 characters long in most modern compilers. Of course, a C program has to start somewhere. By convention, the "main" function is the first user function called when a C program is run. All functions have a list of variables, or formal parameters, passed to them (in parentheses), a return value type, and a function body (in braces). The main function here accepts nothing and returns nothing—the data type "void" means "nothing" in C. Its body contains a single statement, which calls the standard function "printf()". Just one parameter is passed to the printf function, the string constant "Hello, World!\n". The notation '\n' defines a carriage return; the printf function itself does not force a carriage return.

C is a statement-oriented language. It takes all spaces, tabs, and new lines as "whitespace," useful for clarity but meaningless to the program itself. The semicolon character delimits statements.

To run this program, you must compile and link it. Run the compiler, either from the text editor or from an AmigaDOS shell. The shell command for SAS C (version 6.x) to compile and link this example is

```
1> sc hello.c LINK
```

When this is run, several files should be produced. Some compilers may make icon files or other external files, but at the very least you should see

hello.c (the source file)
hello.o (the object file output by the C compiler)
hello (the executable file output by the linker)

When you now type "hello" at the AmigaDOS shell prompt, you should see a result something like this:

```
1> hello
Hello, World!
```

This is a very simple program, of course. The next example is more sophisticated.

Reptilian Draw: Example 1

"Turtles" have been used in computer education for some time. Think of the turtle as a robot that you can direct using simple functions. The turtle has a pen, an ►

```
/* This function initializes the turtle graphics window using Intuition routines. */

void OpenTurtle(void) {

  /* Make sure the turtle system is open only once. */

  if (!TURTLE_OPEN( )) {
    /* Open the graphics and intuition libraries. OpenLibrary( ) calls can
fail, so test to make sure they didn't. */
    GfxBase = (struct GfxBase *)OpenLibrary("graphics.library",0L);
    IntuitionBase = (struct IntuitionBase *)OpenLibrary("intuition.library,"0L);
    if (IntuitionBase == NULL || GfxBase == NULL) {
      CloseTurtle();
    }
    window = OpenWindow(&turtlewindow);
    Home( );
  }
}

/* This function waits for the user to request a window closing, then
frees up the turtle system using Intution functions. */

void CloseTurtle(void) {
  struct IntuiMessage *message;
  BOOL quit;

  /* Stop the turtle only if it's open. */

  if (TURTLE_OPEN()) {
    quit = FALSE;

  /* Wait for a CLOSEWINDOW message from Intuition. A full explana-
tion of this process is beyond the scope of this article. */
    do {
      Wait(1L << window->UserPort->mp_SigBit);
      while (message = (struct IntuiMessage *)GetMsg(window->UserPort)) {
        if (message->Class == IDCMP_CLOSEWINDOW)
          quit = TRUE;
    }
      } while (!quit);
      CloseWindow(window);
      window = NULL;
    }

    /* Close the two libraries, but only if they are open already. */
    if (IntuitionBase != NULL) {
      CloseLibrary((struct Library *)IntuitionBase);
      IntuitionBase = NULL;
    }

    if (GfxBase != NULL) {
      CloseLibrary((struct Library *)GfxBase);
      GfxBase = NULL;
    }
}

/* This sends the turtle "home" to its base location, the center of the
window. */

void Home(void) {
  if (TURTLE_OPEN( )) {
    PenUp( );
    MoveXY(window->Width/2,window->Height/2);
    SetHeading(0);
  }
}

/* The three pen functions simply update the pen drawing codes
and, where appropriate, the color of the graphics system pen in the
window. */

void PenDown(void) {
```

►

```
    if (TURTLE_OPEN( )) {
        turtle.penstate = PEN_DOWN;
        SetAPen(window->RPort,1);
    }
}

void PenErase(void) {
    if (TURTLE_OPEN( )) {
        turtle.penstate = PEN_ERASE;
        SetAPen(window->RPort,0);
    }
}

void PenUp(void) {
    turtle.penstate = PEN_UP;
}

/* This function sets the absolute              0
   turtle heading, in degrees.                  |
   The setting is from 0 to 359          270 —+— 90
   degrees.                                     |
                                               180    */

void SetHeading(int degrees) {
    turtle.heading = degrees % 360;
}

/* This function returns the turtle heading. */

int GetHeading(void) {
    return turtle.heading;
}

/* The relative settings are easily converted to absolutes. */

void Right(int degrees) {
    SetHeading(turtle.heading + degrees);
}

void Left(int degrees) {
    SetHeading(turtle.heading - degrees);
}

/* This function moves forward from the turtle's current position.  If the
pen isn't up, drawing is done. The new position is calculated from the
current position, distance, and heading. */

void Forward(int dist) {
    int newX, newY;
    double radangle;

    if (TURTLE_OPEN( )) {
        radangle = PI/180.0 * (double)turtle.heading;
        newX = GetX( ) + (int)(((double)dist) * cos(radangle));
        newY = GetY( ) + (int)(((double)dist) * sin(radangle));
        MoveXY(newX, newY);
    }
}

/* This function moves backward from the turtle's current position. */

void Backward(int dist) {
    Forward(-1 * dist);
}

/* The absolute coordinate is changed here.  This function respects the
pen up/down setting, via graphics functions. */

void MoveXY(int x, int y) {
    if (TURTLE_OPEN() && turtle.penstate != PEN_UP) {
        Move(window->RPort,GetX(),GetY());
        Draw(window->RPort,x,y);
    }
    turtle.posX = x;
    turtle.posY = y;
}

/* These functions return the absolute turtle position. */

int GetX(void) {
    return turtle.posX;
}

int GetY(void) {
    return turtle.posY;
}
```

Example 1

The first program we'll try includes just turtle functions. It initializes the turtle's Intuition window with the command OpenTurtle(), then puts the turtle's pen down and directs the turtle to draw a box (50 pixels per side). The CloseTurtle() function waits for you to click the window's close box.

```
#include "turtle.h"

void main(void) {

    OpenTurtle( );

    PenDown( );
    Forward(50);
    Right(90);
    Forward(50);
    Right(90);
    Forward(50);
    Right(90);
    Forward(50);

    CloseTurtle( );
}
```

eraser, and the ability to move in a specified direction and distance. By controlling the pen and movement of the turtle, you can write programs that draw pictures in the turtle's window.

The turtle package consists of a main file, turtle.c (see Listing A), and a header file, turtle.h (Listing B). The main file is written in C. I don't expect beginners to understand the whole program at this point, though I have commented it to point out features not fully explained in this text. As mentioned, the C compiler knows very little when it runs. The example program (see Example 1) includes the turtle.h file to gain knowledge of the turtle functions for the compilation stage. The linker is told to link in the turtle.o file, which provides the actual code for the turtle functions. Compile, but do not link, the turtle.c file to make the turtle.o file, which is linked with all the example programs. In SAS/C, this is

```
1> sc math standard turtle.c
```

The math standard switch is necessary to select the math library to use for the angle calculations in the turtle package. Some compilers automatically select a default math library.

A very simple program is shown in Example 1. Like

hello.c, it must include some function definitions, in this case just the turtle functions. All turtle programs start with the OpenTurtle() function, which initializes the turtle's Intuition window. This example then puts the turtle's pen down, and moves the turtle around to draw a box that's 50 pixels on a side. Finally, it winds up with the CloseTurtle() function, which waits for the window's close box to be clicked. In SAS/C, Example 1 can be compiled with the following command:

```
1> sc math standard link example1.c turtle.o
```

This will generate the program.

Next month, we will explore three other examples that work in the same fashion. You may need to refer to *this* article when you try the upcoming examples, so don't toss this issue in the meantime! ■

Dave Haynie works as Senior Systems Hardware Engineer at Commodore. His projects include the C128, every high-end Amiga system, and the A26x0 and A4091 boards. He has been programming since age 12, and is the author of DiskSalv and SetCPU for the Amiga. Write him at Commodore Business Machines, 1200 Wilson Dr., West Chester, PA 19380; or contact him via the Internet: daveh@cbmvax.commodore.com.

Listing B.

```
/* TURTLE.H by Dave Haynie This file defines the turtle graphics routines. */

extern void OpenTurtle(void);         /* Start the turtle graphics package */
extern void CloseTurtle(void);        /* Stop the turtle graphics package */
extern void Home(void);               /* Send the turtle home, heading 0 */
extern void PenDown(void);            /* The turtle starts drawing */
extern void PenErase(void);           /* The turtle starts erasing. */
extern void PenUp(void);              /* The turtle stops drawing/erasing. */
extern void Right(int);               /* Adjust the angle right by "degrees." */
extern void Left(int);                /* Adjust the angle left by angle "degrees". */
extern int  GetHeading(void);         /* Return the turtle's heading, in degrees. */
extern void SetHeading(int);          /* Set the absolute heading. */
extern void Forward(int);             /* Move "dist" units forward. */
extern void Backward(int);            /* Move "dist" units backward. */
extern void MoveXY(int,int);          /* Set the turtle's absolute position. */
extern int GetX(void);                /* Get the turtle's X coordinate. */
extern int GetY(void);                /* Get the turtle's Y coordinate. */
```

C Resources

To program in C, you need a C compiler. You can find compiler packages available commercially and through freeware channels (the Internet, commercial BBS systems, and in the Fred Fish library). Commerical packages are generally easier for the novice to set up, but they can be expensive. SAS/C ($395, ***SAS Institute***) is a full professional system, providing a compiler, linker, text editor, debugger, on-line help, and some useful extra tools. Another C system, DICE (Dillon's Integrated C Environment) is available in both shareware and commercial forms; the GNU C compiler from the Free Software Foundation is also shareware.

Many C tools are available in the public domain, too. A program called cdecl helps demystify one of the things most confusing to beginners and even seasoned professionals: the way complex variable types are declared in C. In most languages, you declare a complex variable based on a structure hierarchy, perhaps something like "X is array [20] of pointer to character." In C, that's "char *X[20]"; the notation is what you need to do to get a character from X. The cdecl program lets you either express the structure in pseudo-English to get the C version, or type a C expression to get an expanded explanation.

There are numerous examples of C source code available, as well. Once you get past the basics of C programming, you may want examples that address more particulars of AmigaDOS itself, or interesting sources from other platforms. Watch out for older sources, which may also use the older C declaration format. If you see main() declared as

```
void main(int argc, char *argv[]) {...
```

you are dealing with current ANSI-standard function parameters. If, instead, it looks like

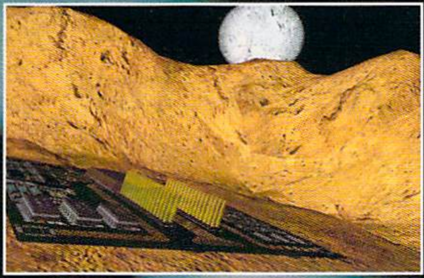
```
main()
int argc;
char *argv[];
{....
```

then you've got code using the older C format. You may run into some problems with such sources. The original C language from the 1970s did not enforce data typing very strongly. As a result, lots of programs were written that, while not technically correct, happened to work on their orginal platforms. If you try to compile one of these, you will see numerous warnings and, in many cases, outright errors. Most C compilers have an option to turn off the enforcement of the ANSI rules, but it's much better practice to write according to the stronger type checking enforced under ANSI. □

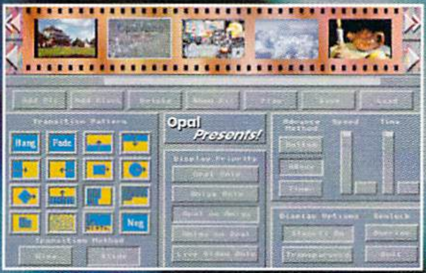
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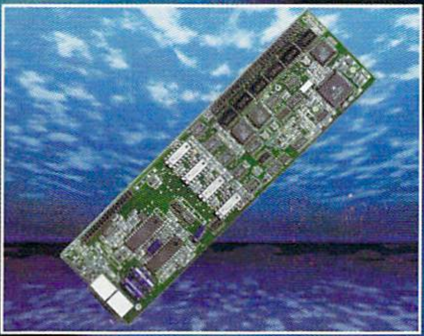
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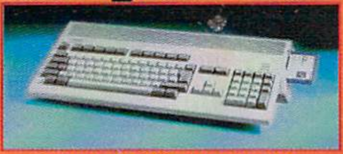
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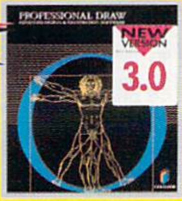
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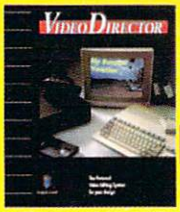
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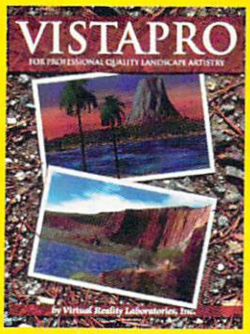


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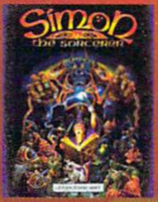
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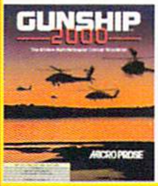
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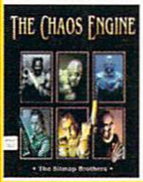
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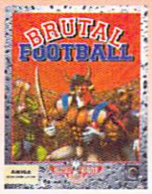
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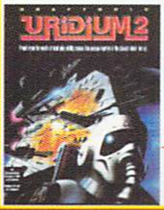
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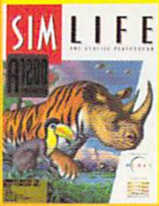
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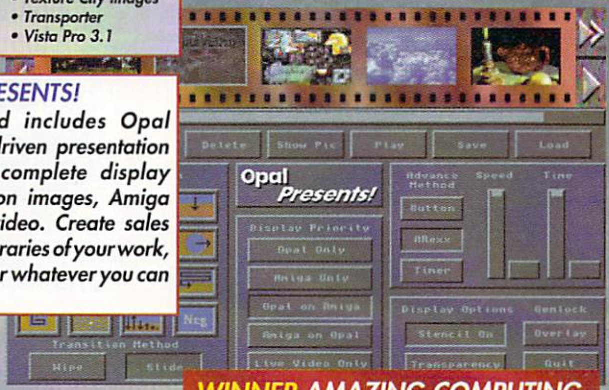
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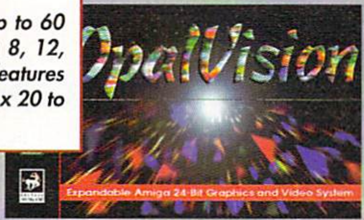


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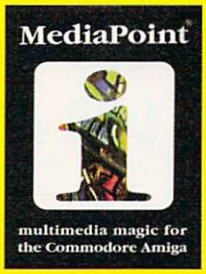
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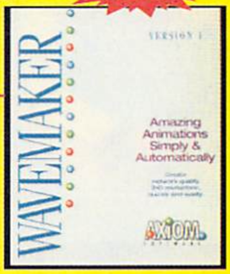
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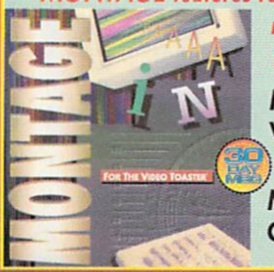
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The Game Preserve

By Peter Olafson, AW Games Editor

Star Trek: 25th Anniversary

A–
1.3 –
2.0 –
3.0 ✓
Hard-drive required.
Off-disk copy-protection.

THE TRANSPORT APPEARS to be working perfectly, Captain. **Star Trek: 25th Anniversary** (*Interplay*, about $38) is an almost flawless replica—both of the original IBM version and of the 1966-69 TV series that inspired it. This long-awaited conversion—held up when the original 64-color rendition was bumped up to 256-color AGA—is effectively identical to the 1991 game, and the tone of the material is unerringly on target.

ST:25 was designed as a sort of miniature fourth season: seven discrete episodes—each beginning aboard the bridge of the Starship Enterprise; each played out in animated-adventure style with Captain Kirk, Mr. Spock, Dr. McCoy, and various red-shirted security guys on planet, space station, or derelict vessel; and each ending as the landing party is beamed back aboard.

You're at home right from the title theme (minus the voiceover) and the Enterprise's flyby. The scripts are originals, but, founded in Star Trek conventions, feel just slightly (and happily) familiar, whether you're getting to the root of computer-created "demons" plaguing colonists; wresting a captive Federation ship from pirates; curing a virus; meeting up again with con man Harry Mudd or a god from Earth's past; outwitting Klingons; or fighting it out with Romulans, pirates, and even a clone of the Enterprise. (What, no tribbles?) The dialogue among the four principals is unforced and pitch-perfect—and nicely abetted by the digitized sounds of communicators, tricorders, and transporters at work. That's a tribute to the writing—a little miracle of transference if there ever was one.

It's also just a good game. The space battles that occasionally erupt are great fun, especially in the glorious full-screen mode. They're essentially arcade sequences, with steering by mouse, one button for phasers and the other for photon torpedoes, and speed by the number keys. But the ships are pleasantly solid and full-bodied, their movement has a smooth flow, the damage takes a realistic toll, and the player's perspective has a consistency. It makes Wing Commander seem like a jumble of pivoting pixels.

It's also possible to finish an episode without touching all the bases (or by touching the wrong bases) and hence get a less-than-perfect score from Starfleet at its conclusion—a feature that should encourage replays. Most commands are issued a set of small but handsome icons that turn up when the cursor's held over the relevant portions of a da Vinci-esque head and torso. (The skimpy docs for the initial European version—the game was coded here, a relative rarity among big-time Amiga games—omit mention of the many useful keyboard commands.)



Join Captain Kirk and company onboard the Starship Enterprise in Interplay's Trekie tribute.

For all that, ST:25 does seem rather small. Each of the episodes has a half-dozen or so locations. The designers haven't made good use of either the supporting characters by allowing the party to split up—this is pretty much Kirk's show—or the rest of the ship. (Only the Enterprise's bridge, which is interactive and transporter room are displayed.)

ST:25 is one of an increasing number of AGA-only games, and this one requires a hard disk (where the installer builds an 8.25MB datafile). Even then, you'll want to call on Scotty for some extra power. The starfield update is slightly ragged even on an '030-based A1200 with fast RAM, and the wobbly mouse cursor doesn't always go where you want it—especially irritating because the icons make such small targets.

But while the technical stuff puts a small dent in the majesty of ST:25, it can hardly affect its effervescent spirit. Star Trek was magic 28 years ago on television, and it is magic now on the Amiga.

Simon the Sorcerer

B–
1.3 ✓*
2.0 ✓*
3.0 ✓*
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Continued on p. 64.

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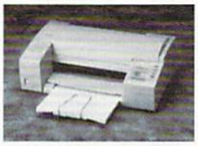
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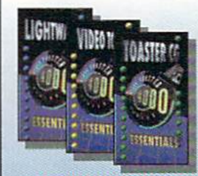
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From p.60.
common tongue with our teammates. When a US game developer drops out of the Amiga market—and they dropped like flies in 1993—an English one always seems willing to pick up the torch and carry on.

For example, shortly after LucasArts let it be known that Fate of Atlantis would be its last Amiga conversion, plans were announced for **Simon the Sorcerer** (***Adventure Soft***, about $40). The publisher's name probably doesn't ring a bell, but the developer's should: Horrorsoft created the two well-received Elvira games for Accolade. Simon's nothing like that. Outwardly, it is as close to a latter-day LucasArts graphic adventure as one could wish—the obvious differences being that the graphics are much better (especially in the AGA version) and that the screen-bottom commands have been recast somewhat and now appear in script.

This will seem especially familiar—perhaps too familiar—to fans of the two Monkey Island games. Just as would-be pirate Guybrush Threepwood must treat with three pirates in the back room of the SCUMM bar at the start of Secret of Monkey Island, so would-be wizard Simon has to satisfy the demands of four wizards in the back room of the local tavern at the outset of StS. Just as the one must get the best of an undead (but silly) pirate, so the other has to settle the hash of a bad (but silly) wizard named Sordid.

For a while, visiting with StS is an altogether pleasant experience, and seems to have been painted with the same Guybrush as the MIs. The huge animated intro—Simon trying to perform a magic trick while the credits roll—is adorable. Simon's not averse to looking straight out of the screen and speaking to us directly. He favors languid, slow-burn conversations that don't make you laugh outright but feed a smile. He doesn't like being left unattended, and, in the fashion of toe-tapping platform characters, will eventually pull a personal stereo from his hat—which holds the whole of his graphic inventory—plug in, and tune out.

Along the way, you'll savor some of the most opulent graphics ever to turn up in an Amiga adventure—not to mention the delightful minor animations of animals frolicking through the backdrops—and click on needle-sized objects in this nine-disk haystack until you're finally at Sordid's front door, and become needle-sized yourself.

Then again, certain elements can't be duplicated so easily, and while Simon's in many ways an exemplary adventure, it lacks the essential "feel" of the LucasArts games. The player doesn't feel a sense of being part of an unfolding story so

SHORT TAKES

Fury of the Furries

A–
1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable.
Off-disk copy-protection.

I'm starting to love this massive arcade/puzzle game from France (Kalisto, distributed by *Mindscape UK*, about $35). Furries are four itty-bitty colored fuzzballs, each with a different skill—unleashing fireballs, stamping through certain blocks, using a rope, swimming underwater.

The tiny voices, lanky level construction, and time limits recall Lemmings; and the puzzles remind you of Rick Dangerous. The joystick control is hair-trigger (in a good way), the difficulty deceptive, the Furry faces a hoot, and the end-of-level screen rotations give the lie to assertions that the Amiga can't handle that little trick. (Take that, Mode 7.) And it sensibly avoids PAL/NTSC problems that plague so many Amiga games by letting you select a mode at boot. A few passwords would have eased my path a bit, but I'm not about to start complaining considering how much fun I've had in a tiny fraction of the total play area.

Space Hulk

C–
1.3 ✓
2.0 ✓
3.0 ✓
Not hard-drive installable.
No copy-protection.

Cons: It ends EA's hitting streak. This long-awaited board game conversion (*Electronic Arts*, $59.95)—a tough 3-D bug hunt a la Aliens—is missing most of the voices and all of the animated intro of the IBM version. It isn't hard disk installable, even though the three disks are AmigaDOS, and by the time I started my second training mission on a one-floppy machine I must have swapped them a dozen times. The walls in the derelict spacecraft your marines are "cleansing" of genestealers look like psychologists' ink-blot tests, with each side of a panel the mirror image of the other. Space Hulk scrolls from square to square, but the speed drags even on an A3000/25.

Pros: The music and sound effects make a significant contribution to the atmosphere, which, despite all the cons, can be as thick as sap in the more substantial missions. The move planning screen, which enables you to set all the troopers in motion simultaneously, is nicely handled.

And the genestealers—shambling horrors which borrow liberally from Giger's Alien—will give you nightmares. Alas, so, probably, will your experience with Space Hulk.

Tom Landry Strategy Football Deluxe Edition

A
1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable.
Off-disk copy-protection.

Some ways back I wrote that the original Tom Landry was the best football game for the Amiga. This updated version only reinforces that impression. No flags on the play here. The first game was already pretty impressive. It lacked only a few peripherals, which are included here: an editor, real league play, better graphics—the color scheme is much more realistic and less gamey—and a host of small improvements (like the ability to finetune a blitz), which you may not be able to identify at a glance but whose presence you'll come to appreciate. It's not a whole new game, but a somewhat more complete one.

The only thing missing is the pro teams. (Those NFL licenses do not come cheap.) But with the editor, that's almost a moot point; some devout soul is bound put together a 1993 NFL data set. To *Merit* and author Kerry Batts: a profound thank you.

Yo! Joe!

C+
1.3 ✓
2.0 ✓
3.0 ✓*
Not hard-drive installable.
Copy-protection.

Elvis wasn't kidnapped by aliens. He isn't living on peanut butter and fried banana sandwiches in a trailer park in Idaho with a 400-pound woman. And his profile isn't burned into a burrito sold to his demon lovechild in Tijuana. I know, because I found him. He's the main character in Yo! Joe! (Blue Byte/Play Byte, distributed by *Kompart UK*, about $35). It's him, all right: Big plume of greasy black hair, sunglasses, white jumpsuit. If he could talk, he'd probably just say, "Thayaverimush!"

'Course, he doesn't talk. We just get this Shadow-of-the-Beast-goes-dis-

Continued on p. 67.

much as the vehicle for a long chain-reaction collision of objects—some of them unreasonably difficult to find. (For instance, why should it be so difficult to simply go behind the cottage where the game opens?) In fact, this really isn't a story—just a character, hurdles for the character to vault over, and a finish line. (They've just plunked down disparate types—a woodcutter, a witch, a pig, an ogre, a musician, an archaeologist named Jones—in Simon's path without much rhyme or reason.)

StS also has a tendency to dump game text over backdrops of similar color—especially annoying when you're getting one-time-only tips in brown-on-brown from the wise old owl in the woods—and to allow puzzles to solve themselves by simply talking to a character. And a side effect of Simon's headphones is that it takes him a lot of time to move around, though you'll appreciate the location-to-location zapping ability that unfolds with the discovery of new areas.

Ultimately, Simon the Sorcerer is a celebrity look-alike. It does a great LucasArts bit, but when you look for something distinctly its own, you don't come away with much of an impression except its similarity to something famous. Stylish props abound, but this Sorcerer has no magic.

MORTAL KOMBAT

B–
1.3 ✓
2.0 ✓
3.0 ✓
Not hard-drive installable.
Copy-protection.

BRUTAL SPORTS FOOTBALL

A–
1.3 ✓
2.0 ✓
3.0 –
Not hard-drive installable.
Copy-protection.

I LOST MY heart to **Mortal Kombat** (***Virgin***, about $35). Also my head, flesh, many pints of blood, a good part of my spinal column...and my dignity.

The "death moves" in the Amiga conversion of this controversial beat-'em-up are not laid out in the manual, but they're all in here. Blood is splattered with most blows. Hearts are plucked out of chests and held up in triumph. Heads are twisted from shoulders. (The spinal column? Oh, that came off with the head.)

As a conversion from the standup arcade game, Mortal Kombat is excellent. Many suggest the Amiga version is the best yet. The digitized fighters are very close to the originals. The sounds are all in place, and the loser's body parts invariably are not.

However, as a game, it's simply a somewhat better-than-average beat-'em-up. Once the shock of the grisly bits has worn off, there's nothing in terms of plot or action to keep your attention.

The violence? It's a bit much—at least for pre-teens—although there's nothing here you haven't already seen 30-feet high at the movies. Of course, it's not the first Amiga game to go over the top, but the most flagrant offenders—Death Sword, Technocop, Moonstone, and The Executioner—have used blood and guts as a distraction en route to somewhere else. (And Death Sword was really funny.) Violence for violence's sake rarely achieves anything artful, and besides, it makes for thin games.

But I'm equally uncomfortable with the logic that says any violence in games is bad, period. An example of blood and guts used to outrageous and brilliant effect is **Brutal Sports Football** (***Millennium***, about $35). It's a richly chaotic medieval version of football—rugby meets the Battle of Hast- ►

ings—and it's the most riotously good time I've enjoyed in an action-oriented sports game since Speedball 2. If I had done a Top Ten last year, this would have been in it.

In fact, the Speedball series isn't a bad basis for judging BSF. Turn that vertical playfield on its side, tilt the perspective from top view to angled-down, and replace the guys dressed for Rollerball with shirtless Vikings (and inhuman opponents), and you've got Brutality.

While you're at it, turn up the violence factor by 10. Tackles here are more like heavyweight bouts. And when they refer to "heads," they're not talking about the coin-toss. In-game decapitations are standard, bringing new meaning to the phrase "he had his head handed to him." You don't want to know how they handle tiebreakers.

Add to this a field littered with powerups and special equipment (not to mention disconnected torsos and heads) and turf that looks like a bombed cemetery, and you'd think it would be difficult to keep track of what's going on. It isn't. In part, that's because play between goals is in one continuous flow, with the view always following the ball. The graphics are also very detailed and crisp, and while the airborne ball sometimes disappears from view, a shadow is there for reference.

And yes, sports-game junkies, it has league play and stats, too: punches, tackles, and stomps.

Global Domination

A–
1.3 ✔
2.0 ✔
3.0 ✔
Hard-drive installable.
No copy-protection.

Rules of Engagement 2

A
1.3 ✔
2.0 ✔
3.0 ✔
Hard-drive installable.
No copy-protection.

When Two Worlds War

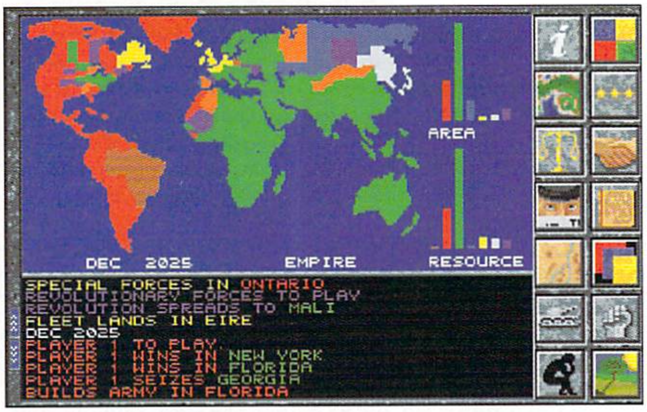
B
1.2/1.3 ✔
2.0 ✔
3.0 ✔
Hard-drive installable.
No copy-protection.

THE AMIGA DOESN'T get that many strategy games, fewer *good* strategy games, and barely any good strategy games at all from US publishers. So when a US publisher brings out two top-notch Amiga strategy games and one good one in close formation, it is an event of no small import. Sit up and take notice, folks. ***Impressions*** has arrived.

Actually, this New England-based publisher has been arriving for some time now. Those who played last year's Air Force Commander, Caesar, and Air Bucks 1.2 know the label has more going for it than its Micro Miniatures line (whose tenacity is out of proportion to the awkwardness of its controls). But the progress has been effectively camouflaged by some backward-looking intermediate releases, and, to the uninitiated, Impressions might have appeared to be just loitering on the porch.

So consider this current trio a figurative bang of the screen door: "Honey, I'm home. I've got Global Domination, Rules of Engagement 2, and When Two Worlds War with me, and we're going into the computer room with a six-pack of Diet Coke and pepperoni pizza, and we're not coming out until 7 AM, and then only to call in sick." That is the sort of games these are.

Global Domination ($59.95) is Risk as you always wished you could play it—twisting the pieces' little plastic necks to turn them into specific types of units (and lots of 'em) and pulling their earlobes until they let you control the battles. The enemies are smart—despite their goofy retorts. Compared to the semi-random numskulls in the Amiga version of Risk, they're virtual Einsteins, with their hands always on your board, taking advantage of weaknesses and mistakes. An AGA version is included on the same disks as the standard Amiga version and comes off a bit crisper graphically, but not so much crisper that OCS/ECS Amigans will feel they've gotten short shrift.



Global Domination: one of three new war-time strategy games from Impressions Software.

And while I've heard Impressions shipped 400 copies (including mine) without the manual, don't think that'll slow you down much. I had a spare set of IBM docs, but looked at them only to sort out fine points.

If you played the original Rules of Engagement, you will be comfortable with its sequel. **Rules of Engagement 2's** ($69.95) interface and controls are similar—that computer-console look—and there's still a mission builder. ROE2 still hooks into Breach 2—and the impending (and gorgeous) Breach 3—so you can fight out shipboard and ground battles in detail.

But don't become complacent. ROE2 has depths you won't sound any time soon. Here's a game you can wear like a quilted coat; there's a sense throughout of being happily surrounded. The enemies can be startlingly smart or just surprisingly lively, and you can create them right down to their artificial intelligence—to the best of my knowledge a computer-gaming first. A "tree" structure is now used for campaigns, in the style of Wing Commander, so different results lead to different missions. And while ROE sometimes struck me as all interface, ROE2 has a more intimate, densely packed feeling of Something Out There That Doesn't Like Me.

The screens are still a bit busy, but also functional (with great little pop-up menus), and I found it easier to understand what was going on. This would be one of the most sophisticated space strategy games for the Amiga even if it didn't have the mission builder—which is to-die-for—and it's one I'll play with pleasure even when I don't have to write about it.

Finally, **When Two Worlds War** ($59.95) is Empire as you only imagined it. The key word here is control. You build different production facilities, program the vehicles, research improvements, and at length send them off to beat down another planet (whose proprietor is trying to do the same to you). This is pretty cool stuff—a more hands-on version of Dune II in some ways—and once you reach the moment of

epiphany with the manual, it's like ice skating.

At the same time, none of the games is quite perfect. WTWW and Global Domination both lost modem play somewhere along the road from IBM to Amiga—not an unusual sacrifice in the conversion process, but a potentially more damaging one than Impressions may have known. Rules 2 similarly has had a few curls taken out of its hair en route, and the graphics could be livelier. (This one could really benefit from AGA treatment, which it's apparently slated to receive only in its European incarnation.)

By contrast, the standard version of WTWW looks good enough to be AGA, but its welter of menus and options is more than a bit obtuse—after all, one of Empire's and Dune II's great assets was accessibility—and I sometimes wished there was more game than gadget onscreen. The learning curve could strike you out unless you're tight with that manual.

None of this will stop you from playing, though. Once you start, I suspect you won't have much choice . . . or much sleep. These games are the definition of addictive. Hook that screen door, turn up the music, and turn off the lights and the alarm clock. If you've got the time, they've got the war.

MORE SHORT TAKES

From p. 64.

co score. He doesn't swing his hips. He just walks sideways through pleasantly knotty landscapes inhabited by squat HudsonSoft sprites and done up in a style that halfway mingles the panache of Gods with a dated, cheesy haunted-house platformer. (Elvis does have a neat ability to grab ledges, which will bring many can't-get-there-from-here prizes within reach.)

And of course the manual (which is a scream, albeit an unintentional one) doesn't admit that he's Elvis. Says he's a graffiti artist named Joe Maroni, and makes him sound like sort of a Super Mario Ninja Turtle.

Which is precisely the problem. For what it is, Yo! Joe! is a perfectly good arcade-adventure, and HudsonSoft followers probably won't think twice about climbing aboard. But aside from quasi-Elvis, there's nothing especially different or compelling to yo-del about.

MICRO MACHINES

B+
1.3 ✓
2.0 ✓
3.0 ✓
Not hard-drive installable.
Copy-protection.

Micro Machines really takes me back. When I was a kid—and not even so little a kid as you might think—my brothers and I would gather every little wheeled vehicle in the house and run rallies over Hot Wheels tracks laid down the garden path. It didn't matter that the scenery consisted of dirt clods, lengths of disenfranchised ice plant, and residue from my father's most recent backyard project, that the spectators were snails (living, smushed, and feasting on the smushed), or that the prize consisted of being carried around in my pocket for the rest of the day. In our little world, this race mattered.

This overhead-view racing game (*Codemasters*, about $35), brought over to the Amiga from the consoles, led me down that garden path all over again. You race three opponents in a range of homey settings—bathtub, sandbox, desktop (real, as opposed to virtual), breakfast table, bedroom floor and so on. The courses have been lovingly customized: A slide rule is a bridge, syrup is a slick, a drain is a whirlpool. Every race is different, and each is a small joy. It's a bit on the childish side, but then, so were our races. This is great fun for all ages. ■

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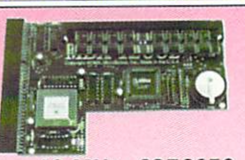
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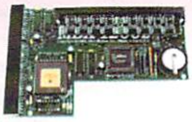
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28MHZ Upgradable to 33 and 40MHz	YES	NO	NO
Expandable Onboard to 128MegaBytes Ram	YES	NO	YES
Built in SCSI-2 Hard Drive Controller	YES	NO	YES
Uses Industry Standard SIMM Modules	YES	NO	NO
Uses any Combination of SIMMS	YES	NO	NO
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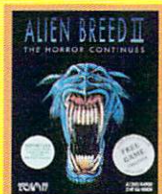
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Compound Motion Paths

63

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

NEARLY EVERYONE WHO has experimented with animation software has discovered how easy it is to spin, move, and zoom a brush using automated motion features. DeluxePaint (Electronic Arts) has its Move requester, Brilliance (Digital Creations) its Tweening, and so on. With these features you can enter values for brush movement and rotation on the x, y, and z axes of computer image space. The software then creates the frames of that motion for you.

Not so obvious are techniques for creating complex brush movements by compounding multiple motion paths. This column will help you set up some revealing experiments that can add new dimensions to your work.

A brain teaser I sometimes pose to animation students is to paint a small moon and cause it to trace a convincing orbital path around a planet as viewed from near the equatorial plane. If you are in a puzzle-solving mood, give that a try before reading much further. In the last section of the column, I'll outline one solution to this using DPaint's Move requester.

Throughout this column, I will refer to DPaint's tools, but the techniques apply to any program with similar features. If you are completely unfamiliar with the Move requester and animbrushes, study the tutorials in your manual to learn the basics.

Join The Movement

From Anim/Frames/Set# create a 40-frame blank animation, stamp a round brush on the screen, and Undo. The values I suggest assume a 640x400 screen, but work in any resolution you like. Just to orient yourself, use the Move requester (Shift-M from the keyboard) to animate the brush across the screen from left to right by entering 200 in the "X Dist" window. Be sure Count equals the number of frames in your animation. Press Draw and DPaint creates a 40-frame animation of the brush moving in a straight line in the positive X direction. Clear all frames of the animation, stamp the brush down again, Undo, and then return to Move and press its Clear button. Now try the same idea in the Y direction. Notice which direction the brush moves for positive and negative Y values. Clear everything and try Z movement.

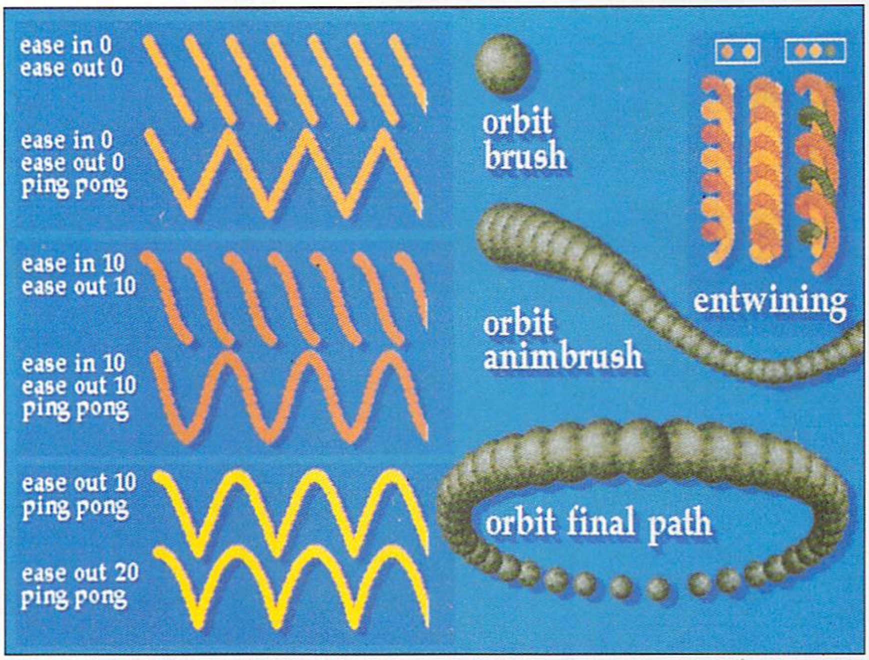
The next experiment involves compound motion. Use a quarter-inch brush and 20 frames. Enter a "Y Dist" of 20 and press Draw. Use Anim/Animbrush/Pick Up to grab that 20-frame vertical movement as an animbrush. Clear all frames and press Shift-7 to reset the animbrush to the first cel. Stamp it on the screen and Undo. Return to Move and clear all Distance values. Enter 200 for "X Dist" and set Count to 200. In the Move requester's Direction panel, press the center Pause button under Record. This allows you to render the movement to a single frame, which makes the path of the brush easy to see. When you press Draw, you should see 10 diagonal lines similar to those at the very top left of the accompanying illustration. (A Count of 200 with a 20-cel animbrush equals 10 lines.) Next, select the ping-pong button in Animbrush/Settings. Locate the animbrush on the page again (Shift-7, stamp, Undo) and then Move. Use the same settings and Draw. You should see an up-and-down zigzag as in the upper left of the illustration.

To add another layer to the exploration, repeat the procedure in the previous paragraph with the following variation. When you first enter the "Y Dist," enter a value of 10 in both Ease Out and Ease In. This causes the brush to accelerate away from its starting position and decelerate into its end position. When that animation is used as an animbrush in the Move requester, the result should be similar to the center-left pair in the illustration. This could be used to draw screw threads by varying the "X Dist" and Count. Ping-pong the animbrush and it describes a sine wave as it moves in the X direction. The Ease settings have a powerful effect on brush paths and can be used to simulate the motion of bodies affected by gravity and accelera-

Achieve complex motion in your animations by experimenting with these animbrush techniques.

tion. The bottom pair of motion paths in the illustration shows the result of using only Ease Out values. This can be used in animating bouncing or ballistic movements.

The next experiment is the "entwining" trick shown at the top right of the illustration. You might use it to paint interesting borders or designs. Place two or three dots side by side and pick them up as a brush as shown. Stamp and Undo to locate the brush on the page. In Move, enter –100 in "Y Dist" and 1200 for the Z Angle. Press Draw to render the rope-like form to a single screen. The dots make several full revolutions around each other as they move down the screen. Experiment with other values and brush configurations. See what happens if you create an animbrush with this technique and use it on a new path in Move. Combinations of these techniques can produce spirals, cycloids, and other complex paths and shapes.



Using a moving image as an animbrush in a new path enables you to achieve complex motion. This illustration shows representations of the experiments outlined in the column, including an orbiting plantet animation.

'Round and 'Round We Go

The planetary orbit is a fun challenge and can produce impressive animations. The realistic motion relies on compound sequences of Ease In and Out values. Set up a 40-frame animation and use a half-inch round brush for your experiments. For a smoother animation, you can use more frames once you are sure of the technique. To simplify things, I will present the steps as succinctly as possible. In Move, keep the Count always at 10 for this 40-frame animation. The orbit is rendered in four phases, one quadrant at a time (e.g., for a 200-frame animation, use a 50-frame Count). You will use either Ease Out or Ease In for each step, but not both. All X, Y, and Z values given are Distance settings.

The first step shrinks the brush into Z space and back in four phases:

1) Z = +250 ease out 10
2) Z = +250 ease in 10
3) Z = –250 ease out 10
4) Z = –250 ease in 10

Pick up this motion as an animbrush and use it in Move for the next path after clearing everything.

The second step creates a vertical path:

1) Y = –30 ease out
2) Y = –30 ease in
3) Y = +30 ease out
4) Y = +30 ease in

Pick up this motion as an animbrush and use it in Move for the next path after clearing everything.

The third step uses a horizontal path to trace the final orbit:

1) X = +200 ease in
2) X = –200 ease out
3) X = –200 ease in
4) X = +200 ease out

As a variation, combine steps one and two and compare the final result. Try your own solutions. You can render the orbital path around a central planet by using Stencil to protect the planet as the distant brush passes behind it in two quadrants. The orbit animation is especially effective if you begin with an animbrush of a spinning planet. In that case, use a total number of frames in your orbit that is a multiple of the number of frames in the spinning-planet animbrush. For more on creating a spinning planet, see my article, "Around the World in 80 Frames," Oct. '91, p. 39, or the tutorial in the DPaint IV manual. Alternatively, try using the tumbling asteroid and starfield from Accent #39 (May '92, p. 48).

Finally, try adding a brush rotation on the y-axis as you create step one of the orbit. Use a value of 90 for the Y Angle for all four phases of step 1. This is especially effective as a titling trick. The brush always faces away from the center of the orbit. As the reverse side of the brush rotates into view, you can darken it to enhance the spatial illusion. ■

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Sound Quality PART 2

We'll wrap up our two-part series on sound for video with mics, mixing, and more.

By Paulo de Andrade

LAST MONTH WE examined some of the essential components of a sound-for-video setup. We'll conclude by looking at the remaining pieces, and learning how to make a final test to ensure your results.

Mic Up

While most video cameras come with a built-in microphone, this mic offers a design compromise so it can perform in a wide range of situations. If you want your productions to sound professional, you need a few specialized types.

The small mic you see on the lapel of your favorite TV newscaster is a *lavalier*. It is designed to pick up the human voice while ignoring ambient noise. Placed close to your subject's mouth, this tiny wonder produces a warm, rich sound. The best lavaliers minimize noise generated by rustling clothes. Size varies from obtrusively large to incredibly small; usually, the smallest are the most expensive.

The *shotgun* microphone picks up sounds directly in front of it, but not from beside and behind. Sensitivity to surrounding sound varies according to the design; consider your particular needs to determine how directional your shotgun mic should be. One that is very directional acts much like a camera's telephoto lens: It must be pointed precisely at the target or you will miss the information. If your subject is in motion, you must track it well. Used in conjunction with a boom pole, a shotgun is great for recording conversations between two or more people.

While all hand-held microphones look similar, they fall into two basic categories: *omnidirectional* and *unidirectional*. The former captures sound from 360 degrees; the latter ignores sound coming from the rear. Unidirectional mics are also called *cardioids* because of their heart-shaped pick-up pattern.

Quality microphones are essential for good audio. There are too many designs to list here, but don't be discouraged by the variety. As long as you buy truly professional models (from makers such as AKG, Tram, Sony, Senheiser, Shure, Electrovoice and Audio-Technica) you should be fine.

Mix It

So you want to play music, narration, ambient noise, and sound effects at the same time? The component that blends these sounds together is the mixer. Manufacturers of pro mixers include Tascam, Peavey, and Mackie.

The typical mixer has a slider-type level control for each audio input, allowing you to adjust the volume of the sounds individually. If you want to emphasize the narration, then, you can make it louder than the music.

The main differences between mixers are the number of inputs and outputs, the equalization process, and the effects bus(es). To figure out how many inputs you need, count your sound sources—remembering that, for most mixers, a stereo source counts as two. If your sources are two VTRs, one CD player, and one DAT recorder, you'll need an eight-input mixer to accommodate each source's dual-channel audio.

If you cannot afford a mixer with an input for each of your sources, consider how many sounds you will need to mix at once in a complex situation and then connect your sources to a patch bay. A patch bay accepts the outputs from all your sources and lets you choose which signal goes where in the mixer. If you have an eight-input mixer and 12 audio sources, you can have all your equipment connected with the limitation that you will be able to mix only eight at a time.

Just as a mixer can have many inputs, it can also have several outputs. For our purposes, though, only two are necessary for great stereo sound.

All good mixers let you adjust certain sound frequencies (a process called equalization). This is similar to the way you adjust bass and treble on your stereo. By increasing the low frequencies you can make a narrator's voice sound deeper (this is common in radio and television). Good equalization controls also let you "cut out" some frequencies, which helps minimize different types of noise. The number of separate frequency bands you choose depends on how precisely you need to manipulate the sound. I consider the ability to manipulate three distinct frequencies—lows, mediums, and highs—the minimum requirement.

The last consideration in choosing a mixer is its effects-handling capabilities. All good mixers can send signals to effects/audio processors and then receive the altered sounds. Make sure you can adjust the effects level for each channel.

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GVP

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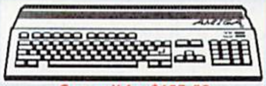
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A3000 Keyboard	59.95
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Circle 88 on Reader Service card.

a multi-effects unit that does the job of several dedicated components. If you are planning to buy a multi-effects unit, make sure it can perform several functions simultaneously; some models handle only one task at a time. Here are the basic effects to have:

Digital reverb adds depth to sounds and aids in the simulation of natural acoustics. In real-world environments, sounds echo (reverberate) off of walls, ceilings, and so on. Digital reverb can greatly improve a narration that sounds "canned." There are several levels of reverb, ranging from the very subtle to long, repetitive delays.

A *compressor/limiter,* used constantly in television and radio, packs as much dynamic sound range as possible into a narrow region. Let's say you are producing a TV commercial and you want your audio to be loud and clear without exceeding the normal sound levels (and consequently ending up with distortion). With a compressor/limiter, you can keep all your sounds equally loud—at the high end of acceptable—without exceeding the limit.

Noise gate is handy when you have undesirable background noise. It mutes sound until a certain level is reached. Then it automatically—and instantly—turns the audio on. If you have an interview in a noisy room, you can adjust the noise gate to trigger the audio only when the subject and interviewer are speaking, and thereby eliminate distraction.

Setting Records

Just as NewTek's Toaster changed the world of video, personal computer-based digital recording is revolutionizing audio. I believe that the best solution currently is the ***SunRize* AD516** board and its **Studio 16** software ($1495). This incredible board is perfect for video post-production. It lets you record and play up to eight digital tracks, with quality surpassing that of a CD.

The audio is recorded ("sampled") directly to your hard disk. Fom there, you can manipulate it in several ways. You can add echo, for instance, create permanent fades or volume changes, or scale the sound so that its volume is as high as possible without distortion (as with a compressor/limiter). You can edit in a nonlinear fashion. Sound is shown graphically on screen and you can zoom in for accuracy. You can select a range from the graphic and play it. When you find the section you want, you can cut, paste, invert, repeat, and more. This versatility lets you remove unwanted background noise with ease, or replace one word with another cut from a different section of a narration. The possibilities are tremendous.

Why Multiple Tracks?

Good audio requires several tracks. Let's say you are producing a documentary. You want the music to be in stereo to accommodate stereo TVs—that's two tracks, one each for the right and left music channels.

You also have two talents who speak simultaneously—into separate microphones (so you can adjust levels and equalization individually). That's two more tracks, bringing you up to four.

While the music is playing and both talents are speaking, you show an image of a flying eagle, adding the bird's sound to the fifth track. To emphasize the eagle's flight, you add the sound of wind from a sound-effects library, using the sixth track.

Now we hear a car in the distance

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X2A

MICROSPHERE, INC.

(on the seventh track) and, suddenly, a shot (on the eighth track) as we cut to a hunter taking aim at the bird.

You could accomplish a similar effect by mixing the different sounds in several passes using traditional methods. But doing so would involve much work and degrade the quality. With the AD-516, you have all the sounds on individual tracks, ready to be mixed down to the edit deck's two tracks. The result is a perfectly balanced digital-quality stereo soundtrack with no added noise.

Frame Accuracy

Another great feature of AD516/Studio 16 is the ability to assign sounds to specific time-code addresses and lock perfectly to video. The board has a SMPTE time-code input that can connect to the SMPTE output of your VTR. With time code, each video frame has a specific number, or address. This number never changes, and a frame always has the same address (unless you record a different time code).

With Studio 16 you can take advantage of this precision by assigning sounds to specific frames. Using the documentary example, the hunter shoots at the eagle again. This time, the hunter is on screen and we want the sound of the gunshot to match the frame where we see the rifle being fired. We advance the tape to that frame, read its time-code address, and type that number into Studio 16's Cue List for the gunshot sound. When we play back the tape, Studio 16 will sound the shot exactly on time.

Synchronizing sound to video this way is extremely easy and saves many videotape edits. It also saves wear and tear on your VTRs, especially the video heads. In fact, VTR maintenance savings alone can easily pay for the SunRize board in the long run.

The Hookup and Final Test

Cables are frequently underrated but important. Make sure you use only quality cables and connectors; inferior ones can cause several problems. Besides, cables are one of the least expensive part of the audio system, so there is no reason to skimp here.

Once your components are connected and everything sounds great on the studio monitors, you should make one final test—and a very important one—before you record your final soundtrack to video: Make sure the audio sounds good on an ordinary television speaker. The speakers on most TVs are very limited and cannot handle too much bass without rattling the whole set. If your audio was adjusted properly, it should sound fine on any TV—but you don't want to discover problems when it's too late.

Your recorder VTR should have an audio output called "monitor." This is usually a mono output that can connect to your video monitor's audio input. Most professional video monitors have built-in speakers designed to mimic the average TV speaker. Turn down the volume on your pro amplifier and turn it up on your video monitor. If the sound is not good, adjust your equalization to get rid of excessive bass or to emphasize weak frequencies. Once it sounds OK, reduce the monitor volume and crank up the amp's level.

With the right equipment, your videos will turn out better and you will have more fun. ■

HELP KEY

"Driving" instructor Tim takes a look at older hard drives and their associated ills, and offers some floppy-drive tips.

By Tim Walsh

HIT-AND-RUN DISASTER

Q. *While my GVP hard disk-equipped A500 was in the process of warming up, an inebriated driver took out a nearby utility pole, in turn damaging the part of my hard drive that autoboots the system. I cannot send the unit to GVP for repairs, since it was the driver's fault, not GVP's. At this point, I need the following: a defragmenting utility, a floppy drive alignment program, and a program to create an autoboot partition for the GVP HD.*

David Simon
McHenry, Illinois

A. For defragmenting your drives, there are several options available. Disk #519 of the freely distributable Fred Fish collection includes ChkFrag, a program that checks the level of disk fragmentation on both floppies and hard drives. If you have a badly fragmented device, the best solution is Holger Kruse's freely distributable ReOrg 3.1, which has been in the public domain since last September. Sporting a nicely designed interface, this program defragments any loose blocks on both floppy and hard disks, using a graph for a real-time depiction of fragmentation level and the program's progress. Use this utility with caution, though—I once completely trashed all the data on a nearly full hard disk by inadvertently interrupting it in midstream. A recent patch to this file is also available on most BBSs.

For a floppy drive alignment program, now-defunct Free Spirit Software sold a program several years ago called "Ami... Alignment." I've found this program to be very useful; in fact, I managed to save several floppy drives that had been stored in a back closet because they could no longer read disks. Ami... Alignment brought these drives back from early retirement. With some persistence and a little luck, you might be able to locate a dealer or mail order house that may still have this program in stock. Freely distributable offerings for alignment programs are rare; however, CompuServe does stock a program called ALIGN1.LZH in the Disk Utilities library of the Amiga User forum. While I currently don't have a floppy drive whacked far enough out of alignment to test the program's accuracy, it seems to go through the disk-alignment motions with a certain authority.

GVP's installation software for its A500 hard drives included FaaastPrep and assorted mounting utilities that took care of those set-up procedures. If you no longer have the accompanying prep disk, your best course of action is to request a replacement from GVP, or find someone who is willing to lend you a copy.

BULLET TIME

Q. *I have an Amiga 2000 equipped with a M.A.S.T. Fireball hard-drive controller and an 8MB RAM card. My problem is that the controller does not seem to operate under AmigaDOS 2.1. When the 2.1 Kickstart ROM is installed on the motherboard, the computer refuses to boot, even from a floppy. If I replace the Kickstart 1.3 ROM, all is fine. I tried to contact M.A.S.T. at its Sparks, NV, address without success. Is there an upgrade kit for the Fireball, or do I bite the bullet and invest in another controller?*

Doug Koehler
Bettendorf, Iowa

A. Indeed, M.A.S.T. has vanished into the great unknown and has left behind a trail of orphaned products. The best course of action is to replace the controller with one from another developer. If the Fireball is an autobooting SCSI controller, be sure to replace it with a similarly equipped controller, such as a Commodore A2091, which will work fine under the newer operating system.

I suggest you consider another potential problem—not mentioned in your letter. On the off chance you installed the 2.1 ROM and your A2000 is equipped with the once-popular Commodore 2620 accelerator, there are two socketed ROMs on it that need upgrading in order to work with 2.04 and higher. The top (U5) ROM is numbered 390283-01 and the bottom ROM is numbered 390282-01. These need to be replaced with ROMs 390283-07 and 390282-07, respectively.

MUFFLER REPAIR

Q. *I use an A2000 with 2.04 Kickstart ROMs. Is it possible to turn off the "clicking" sounds the floppy drives make when a disk is not inserted? I've tried to alter the startup sequence to no avail.*

C.J. Talbert
Pensacola, Florida

A. Rewriting your startup sequence is not the answer—unless you're adding a line to launch a utility that silences the clicking. A number of multiple-function utilities, such as older versions of SetCPU and a small assortment of miscellaneous freely distributable offerings, muffle clicking drives. You can find Lake Forest Logic's freely distributable NClick by Eric C. Quackebush on a few disk collections and BBSs. This AmigaDOS 2.0-and-higher program is a little tricky to use, only because it doesn't employ conventional syntax, and documentation typically isn't included with this small program. To launch this from the command line, you must enter "NClick 1"—not "NClick df1:"—to silence drive df1:. Workbench 1.3 users need to find a copy of NoClick 3.6, another freely distributable offering for making Amigas quieter.

Now, if there was only a utility that could quiet cooling fans... ■

*Having technical difficulties? Write to Help Key, c/o **AmigaWorld** Editorial, 80 Elm St., Peterborough, NH, 03452.*

From p. 19.
includes a separate program—the Form Designer—that lets you graphically design forms to be used both for data entry and for printed reports.

While the Form Designer is easy to use, it can be a little confusing at first, as it does not follow all standard Amiga conventions. For example, to select an object on the screen for editing requires a double-click with the mouse instead of the usual single click. And if you have a large field to be filled with text, each line must be entered individually. You must place the cursor at the start of the line with the mouse, type a line of text, then awkwardly place the cursor on the next line with the mouse to continue typing.

Data generated by most later versions of popular PC programs such as DBase and Lotus 1-2-3 can be imported and exported by SBase4. Note that this requires Workbench 2.1 or higher, or a separate utility such as CrossDOS to read and write PC-formatted disks. If you need to look at this data, you can use the Open File menu item, but this does not allow you to change any of the data. To do so, you must use the Process Import menu, which converts the foreign file to SBase4's own format for manipulation. You can then choose to save it as an SBase4 file, or to export it, either back to its original format or to any of the other database or spreadsheet formats supported. Oxxi recently upgraded its spreadsheet, Superplan ($149.95), which now works under AmigaDOS 2.0/3.0; both versions of SBase4 can directly read its files.

Packaged Deal

To make things easier, SBase4 includes another leftover from earlier Superbase programs—a telecommunications module. Connected through a null modem cable or phone modem with a remote machine, it supports speeds up to 19,200 baud, along with three file protocols. Pro also adds the ability to program the function and help keys with commands or text strings of up to 255 characters.

Also included in both versions of SBase4 is a mini text editor. It includes such basic functions as cut-and-paste and search-and-replace, but it is not a full-featured word processor. As with earlier Superbases, mail-merging text with SBase data files remains its best feature.

The major functional difference between the Pro and Personal packages is the inclusion of the Database Management Language module in the Pro version. A complete programming language founded on BASIC, DML is optimized for database tasks. At the simplest level, it can be used to write macros for automating repetitive keyboard and mouse actions or often-repeated steps. At the upper end of the complexity scale, you can create complete applications with their own custom menus and requesters. Applications developed with DML can be used by any SBase4 owner. By purchasing a separate Developers Extension ($399.95) one-time licensing fee, you can even create stand-alone applications.

Despite a few lingering inconveniences and an imposing learning curve for fledgling database users, SBase4 has matured well over the years. Both programs remain an excellent choice, offering levels of flexibility that meet the needs of virtually any business or home database application you may have.

—Rob Hays ►

Video Toaster 3.1

NewTek, free to registered owners of 3.0

Toaster-equipped A2000, A3000, A4000.

2.0/3.0 compatible.

Hard-drive installable.

Not copy protected.

Accelerator compatible.

Minimum system: Amiga 2000 or higher, with Video Toaster 3.0, hard disk, 9MB RAM, 1MB chip RAM.

Recommended system: 200MB or larger hard disk, 68030 or faster processor, 2MB chip RAM, 16MB or more fast RAM.

Upgrade software for Toaster 3.0.

Toaster 3.1 is the first inner-revision upgrade for the Video Toaster 4000. Aside from bug fixes and several new effects in the switcher, there are some new features in the CG and LightWave/Modeler. The update also contains pages that replace erroneous ones in the previous manual, as well as new documentation and an index.

New and Improved

The software comes on six disks, and you install it with the same installer program that accompanied previous revisions of the Toaster software. (Hopefully, the next major upgrade will finally include a more flexible installation routine.) After loading the switcher, you'll notice that some effects that had been removed in 3.0 are back (like PeelFlyAway), and some that didn't work correctly have been repaired. There is also a much speedier Framestore save, which is a real boon.

The CG can now handle color-gradient font faces and outlines, and its use of boxes on scroll pages has been fixed. New color fonts are available, and some font-book listings that were missing in the previous version are now in the manual.

LightWave now can turn off rendering to the DV1 framebuffer. This, while saving only a few seconds per frame, makes a significant difference over the course of a lengthy animation. It also can now overlay a string of text onto rendered images, making it possible to do things like place the phrase "Test Render" on animations sent out for client approval. Both of these features, while not overwhelming, are nice touches that make working with LightWave a little easier.

Modeler 3.1 has undergone some corrections, and better explanations of some of its functions are in the manual. It also comes with more ARexx macros, and the manual update gives descriptions of what all of the included macros actually do. Corrections have been made as well to the initial Modeler tutorial and the tutorials on creating the Wedding Bell and the planet Saturn.

The Price Is Right

The introduction of 3.1 at this time invites the question, "Why the upgrade?" While there's minimal comment from NewTek, it should be noted that LightWave 3.1 does not work with LightRave (Warm and Fuzzy Logic), while, oddly enough, Modeler 3.1 does. There were some niggling problems with the previous release of the Toaster software, so it's good to see them corrected. Although there's little here to get truly excited about, anyone who has a Toaster would be wise to take advantage of this no-cost upgrade. ■

—Dave Thomas

B A C K T A L K

Candid Responses to *AmigaWorld* Reviews

SCSI-TV Retested

We are pleased that you included our product, SCSI-TV 570, a hard-disk interface for CDTV, in the December issue ("Spin Doctors—Part 2," p. 41). Readers can contact us at AmiTrix Development (5312-47 Street, Beaumont, Alberta, T4X 1H9 Canada), or via e-mail: AFolkins@BIX.com (Usenet and BIX) or 74130,3033 (CompuServe).

Unfortunately, the only external hard drive available when testing the SCSI-TV was an older drive of considerably slower performance than those used with the rest of the review. To give a better comparison, we have rerun the speed tests with a 2-1/2" Quantum Go-Drive 80S (16 ms) hard drive, mounted on the card. The SCSI-TV 570 interface produces comparable performance numbers to those in the table, since they are identical except for the case and orientation.

SysInfo 3.14 (system read speeds)/SCSI—**1103**

MKSoft's DiskSpeed 4.2 (directory manipulation speeds):

Create: 12 **Delete: 43**
Open: 24 **Seek/Read: 39**
DIR.Scan: 60

MKSoft's DiskSpeed 4.2 (file create, write, read speeds):

Create: 205 **Read: 965**
Write: 803

Adding fast RAM to CDTV with an expansion board such as our soon-to-be-released CD-RAM should improve these numbers even further.

Dale E. Currie
Technical Support, AmiTrix Development

DevWare Video - Now 100% Toaster!

AXIOM SOFTWARE

WaveMaker

Effortlessly create flying logos in seconds instead of hours! Simply tell WaveMaker the logo you want to animate, how you want it to fly around the screen and what elements you want in the background. Saved time=money made! Comes with a video demonstrating WaveMakers capabilities (i.e. *your* capabilities) to your clients. T5159 **$154.95**



Pixel 3D Pro

Blowout! $84.95

The premier 3D logo creation software just got even better! Now includes full Postscript extrusion. Toaster 4000 compatible! T5158

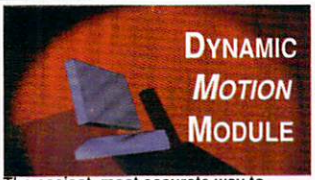
ANIM Workshop 2.0

Create, play, edit and add sound to your Anims...automatically! Use Art Dept on any/all frames of your animation! Now supports Anim5, 7 and 8! T5104 **$99.95**

WaveLink

Double the speed of LightWave! Allows two Toaster systems to render at the same time. Also allows file sharing. T5155 **$99.95**

Pixel 3D Professional+ ANIM Workshop 2 T5160 **$174.95**



The easiest, most accurate way to motion-animate with LightWave 3D! **$129.95**

Dynamic Motion Module lets both animation novices and experienced animators rely upon the laws of physics and computing power of the Amiga to automatically define and create real-world motion and object interaction in LightWave animations. Tell the program how much an object weighs, how fast it's moving, and its direction of travel. Then sit back and let your Amiga define the motion and interaction of the objects in the scene. Many other features which make it perfect for all animation tasks! T5054



Sparks

Particle animation system for LightWave 3D. Particles bounce with real world behavior & gravity! Multiple point gravity wells allow bending and directing the stream, flock or swarm of particles. Control Origin, direction, gravity, quantity, spacing, elasticity and mass. Complete with wind, gusting, flaking and swirling controls–adjustable per axis! Do in seconds what would take days to set up! T5164 **$99.95**

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Every Video Toaster system leaves Atomic Toaster *completely* configured. Each hardware element is installed, tested, and burned in for 12 hours before we release it. Any additional software is always installed and assigned properly. All you need to do is follow our instructions on setting up the system, connect the necessary cables, turn on the system, and start being productive. Below are three examples of systems we can customize to your specifications. Any substitution is possible. Call us for pricing.

The Starter System *"I need just a basic Video Toaster System. I'll need to perform some edits, create some graphics, prepare some title pages, and add pizzazz to general production skills."*
Solution: Amiga 4000/040, Video Toaster 4000, 10 MB RAM, 240 MB Hard Drive, 1942 Monitor. Some options might include: TBCs, remote rackmount, monitors, Crouton Tools 4000 and/or Toaster Toolkit 4000 utilities. Call for pricing!

The Animator *"My interest is in 3D graphics and animation. I can't afford a big system but, I need to create and animate high quality 3D graphics for a variety of clients. As my client list grows, my system must be able to grow with me."*
Solution: Amiga 4000/040, Video Toaster 4000, 18 MB RAM, 340 MB Hard Drive, 1942 Monitor, Pixel 3D Professional, Art Department Professional, Brilliance. Some options might include: DKB memory board for longer animation playback directly out of the Toaster and an SFC for tape based animations.

The Artist *"I am a computer graphics artist. I need the power of the Toaster's 3D, CG and paint systems, but I will supplement it with my own graphics skills. I know that ToasterPaint is powerful, but I need a full screen 24-bit paint system that will work with a vareity of computer images."*
Solution: Amiga 4000/040, Video Toaster 4000, 18 MB RAM, 340 MB Hard Drive, 1942 Monitor, Retina Board (4MB), TV Paint, Pixel 3D Professional, Art Department Professional, Image F/x, Brilliance, Crouton Tools 4000. Options might include: Removable media for transferring images from one system to another, drawing tablet, Professional Page or PageStream for outputting your work to Postscript or print, Sharp or Epson scanner for scanning of images and artwork into the system.

The Craftsman *"I produce video for a wide variety of clients. Whatever they ask for, I need to be able to supply it to them. My work has to be top quality, as my competitors are actually the local TV stations. Whatever they can do, I need to do for my clients."*
Solution: Amiga 4000/040, Video Toaster 4000, 18 MB RAM, 380 MB Hard Drive, 1942 Monitor, Retina Board (4MB), SunRize AD516, Pride A/B roll editing controller, MONTAGE for the Video Toaster, SuperJam! Bars & Pipes Professional, Roland Sound Canvas (MIDI module), Art Department Professional, MorphPlus, MultiFrame, ProFills, Brilliance, TV Paint Pro, Vista Pro (landscape generator), Toaster Toolkit 4000, Crouton Tools 4000. Options might include: Removable media for transferring images from one system to another, drawing tablet, Professional Page or PageStream for outputting your work to Postscript or print, Sharp or Epson scanner for the scanning of images and artwork into the system.

The Professional Animator *"Besides using the Toaster as an all-around production tool, I need to create corporate, industrial, and commercial animations. My work has to be broadcast quality and I must have the power to compete with other top competitors in the field."*
Solution: Amiga 4000/040, Video Toaster 4000, 18MB RAM, 780 MB Hard Drive, 1942 Monitor, DPS Personal Animation Recorder, Nucleus Single Frame Controller, Pixel 3D Professional 2.0, Art Department Professional 2.3, Morph Plus, ADP Tools Professional (animation processor), Dynamic Motion Module (real-world motion animation module), Vista Pro 3.0 (landscape generator), Toaster Toolkit 4000, Crouton Tools 4000. Options might include: DPS Personal TBC IV for rotoscoping applications. Call for pricing!

The Editor *"My goal is to create a complete edit suite based around the Video Toaster. I need to perform A/B roll video editing, create graphics and animations, as well as record narration, edit sound effects and synchronize music with video."*
Solution: Amiga 4000/040, Video Toaster 4000, 18MB RAM, 380 MB hard drive, 1942 Monitor, Pride Integrated A/B Roll Editing System, SunRize AD516 (8-track digital audio), Crouton Tools 4000, Toaster Toolkit 4000, Montage (character generation software), Roll'em (teleprompting software). Call for pricing!

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•Full-color animated wipes with transparencies and shadows!
•New CG software supports Postscript type 1 and Compugraphic outline fonts!
•LightWave 3D software has been completely optimized for the 68040 processor and features over 250 new photo-realistic features! V5050

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Montage



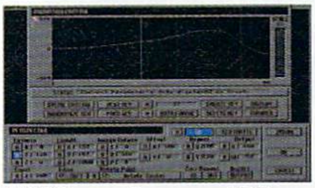
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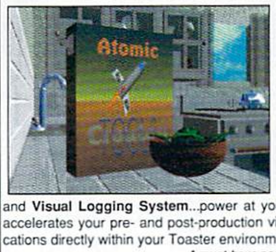
A+ Development

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Crouton Tools 4000



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A must-have package for serious video professionals!

Toaster Toolkit 4000



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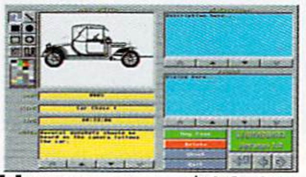
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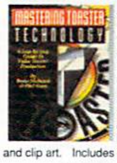
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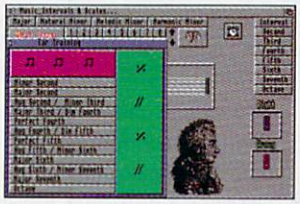
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AW, Shucks!

In the March '94 issue we neglected to publish contact information for SeaScape Software, developer of the game Jet Strike we reviewed that month. SeaScape's address is 106A-2621 Portage Ave., Winnipeg, Man. R3J 0P7, Canada; phone is 204/889-3357.

More recently, our April issue listed an incorrect telephone number for Oregon Research. The correct number is 503/620-4919.

We apologize for any inconvenience these errors may have caused.

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WB139: MIDI Performance Manager Utility to manage a MIDI synthesizer and other MIDI equipment. Requires WB 2+.
WB138: 3.0 Extras #2 - Another disk chocked full of utilities to unleash the power of Workbench 3.0 and AGA!!
WB137: The ARexx Guide - Full AmigaGuide (inc.) document to teach you ARexx!!! Tip-filled with easy x-referencing!
WB136: Terminus - WB2.0+ Modem/Terminal program. full featured: scripts/screenmodes/overscan etc.
WB135: 3.0 Extras #1 - 13+ utilities for WB 3.0. Several must-haves for getting the most out of your new graphics modes!
FD94: Scorched Tanks - completely updated and compatible with AGA/3.0! 60 different ways to blow each other away! An outstanding game of angles, trajectories & unique arsenals!
FD93: MegaBall AGA - This is the one you've been waiting for! Updated to knock your socks off! THE best p/d game for the Amiga. Req.'s WB2+ & 1MB RAM. Show off that AGA!
FD92: Blast'em - contains Scorched Tanks--a tank battle with futuristic weapons/defenses & "great" graphics. Galactoid is a Galaxian/Space Invaders game completely Amiga-tized.
FD91: Popeye - A clone of the original C-64 classic--Amiga style with enhanced graphics. Requires 1MB chip RAM for PAL mode.
FD90: Conquest & Dominion - Conquer the known world and maintain dominion over it--a microcosm of economic survival.
FD89: Kastle Kumquat - A thoroughly entertaining and challenging maze/adventure game. Great soundtrack and graphics. Req's 1MB Chip RAM (for PAL mode).
FD88: AmyBoulderdash - a clone of the original classic.. extremely well done complete with level editor, 2 complete sets of levels and a level editor. Requires Workbench 2+.
FD87: OXYD- A commercial quality game--similar to Marble Madness in nany ways, but allows two computers to link & play together...see how many of the 200 landscapes you can complete without having to get the hint book!
FD86: UChess: The strongest playing Chess program available for the Amiga period. Req. 68030+, Workbench2+, 4MB RAM or more. Supports AGA (req. 8MB!)
DD92: Developer Contains the official Commodore developers kits for the AmigaGuide and Commodore Install Utilities...a must have for all serious developers.

FUN DISKS

FD6: GAMES! - This disk is chock full of games including; Checkers, Clue, Gold - A new slide the pieces puzzle, Jeopard - An enhanced version of Risk, RushHour - Surprisingly addicting, and SpaceWar - Best described as a cross between Combat-Tanks and asteroids.
FD7: Pacman - This disk contains several pacman type games including; PacMan87, MazeMan and Zonix.
FD10: HackLite - A dungeon adventure game. Considered a must-have classic. This is the 2nd release of this game. Great graphic interface. Play time several weeks!
FD11: Las Vegas and Card Games - Las Vegas Craps - The best Las Vegas Craps simulation every written for any computer. Contains extensive HELP features, Also Thirty-One,VideoPoker and more.
FD12AB: Star Trek, The Game - This is by far the best Star Trek game ever written for any computer. It features mouse control, good graphics, digitized sound effects and great gameplay. Counts as 2 disks. Req. 1Mb and two drives (or hd).
FD13: Board Games - contains Monopoly, Dominoes, Paranoids, and others.

DD83: IBM - Not one, but *TWO* IBM emulators that will allow the running of MS-DOS software *with* Amiga programs!!! Comes complete with programs to turn your Amiga floppy drives into 720K IBM compatible drives. Also, check out our PC-Task emulator on our DevWare Video page!

FD17: Educational Games - This disk includes several games for youngsters including geography, math, science, and word games, also includes Wheel of Fortune.
FD20: Tactical Games - MechForce; A game that simulates combat between two or more giant robots. Simple words can't begin to give you the feel of piloting a 30 - 40 foot tall, fire breathing, earth shaking colossus that obeys your every whim.
FD27: Arcade Games - This disk is loaded with some great games. Includes, Raceorama a great racing car game with ten different courses, MiniBlast a helicopter gunship type clone, Shark in the same class as frogger, and SBreakout the original breakout with more.
FD31: Games! - Air Traffic Control - a good ATC simulation, Black Jack Lab - a full featured set of card games, ChessTel - play chess with your friend in distant and remote places with this game and a modem, labyrinth - a well done text adventure game (like an infocom game), and MouseTrap - a 3d maze game.
FD32: Flight Simulator - An instrument simulator for a DC10.
FD33: Arcade Games - Ffreddy a Mario Brothers type of game, Gerbils a target practice game, PipeLine a German interpretation of Pipe Dreams, Tron a light cycles version, and Wetroids a wonderful version of asteroids with a hilarious twist.
FD38: Games - Cribbage Master - A great cribbage game and tutor, Spades - a well done card came. ChineseCheckers - A computer version of this classic. Puzz - a slide piece puzzle game and construction set.

WB105AB: Workbench 2+ Extras #2

This set contains the programs that should have been included with WB2+. These powerful utilities take full advantage of the many new capabilities that are available in Workbench 2+. Includes; Tool Manager - a wonderful utility to add programs to your TOOL menu. Virus Protection - Degrader, Icon - Enhances Workbench's "Show All" to display over 40 distinct icons for different types of files. Bitmap Font Editor, Screen Blankers - ala fractals and spliners and swarming bees! Requester Enhancers and CPUBlit. Two disk set, counts as two.

FD39A&B: Star Trek, The New Generation - This is a completely different version of Star Trek than that found on FD12. This one was created by the German author Tobias. Excellent!!! Counts as two disks. Requires 512k
FD50: Submarine Game - Sealance, one and a half years in the making, this is an outstanding submarine tactical game. Commercial quality, highly recommended.
FD57: Arcade Games - Includes 2 truly commercial quality games. MegaBall, an Arkanoid-ish game, features 5 musical scores and addicting gameplay. Gravity Attack is a psychadellic trip through several different worlds—each different.
FD59: Game Potpourri - Xenon III is an almost exact clone of the commercial game of the same name, a great shootemup. Crossword will take lists of words & automatically generate word-search puzzles for any Epson compatible printer.
FD60: Games - In Nebula, race over a 3d world to destroy enemy installations. Interferon: a *great* Dr. Mario clone. Enigma; is it a game or puzzle?
FD61: Games - Solitaire; great graphics, plays two versions. Klide; an interesting piece of eye candy. Extreme Violence; 2 player kill or be killed game. YATC: A Tetris clone with Artifical Intelligence. Genesis; create realistic 3d fractal worlds.
FD62: PomPom Gunner. An extremely smooth and well done World War II gunner simulation. Req. 1 megabyte of memory.
FD67: Arcade - Includes Llamatron a well-done 'Robotron' clone. Hate is a "terrific" Zaxxon clone with multiple levels/worlds and smooth diagonal scrolling...a 10!
FD69: MindGames - Had enough of shoot-em up games? Relax and let these 21 games exercise your mind instead of your wrist.
FD73: Arcade Series - Intruder Alert! is a MULTI-level "Berserk" clone. Features smooth gameplay, great graphics & digitized sound f/x.
FD74: Arcade Series - RingWar is an "Outer Limits" clone with vectorized graphics. MotherLode is a "Lode Runner" clone with 50 levels! In BlitzTanks, they're coming at you from all directions!! Call in air strikes and use your heavy artillery to survive!
FD75: Arcade Series - Descender is a clone of the classic arcade game "Tempest"; complete with vectorized graphics. Tanx is the classic battle of trajectories and inertia between two tanks—incredibly well done! Search is a maze game unlike any other—included is a level editor too. (Tanx requires 1 meg chip memory=Fat Agnus)
FD77: Arcade Series - Galaga'92 is a clone of the arcade game with several gameplay enhancements--with smooooth, sharp graphics, it's better than the original! Pharaohs Curse is a clone of the original C64 classic. Diplomacy is a beautifully computerized version of the Avalon Hill board game--conquer or be conquered!

THE AMIGAWORLD "BEST-OF" SET

FD85ABCD: AmigaWorld's Best - These four disks contain the *hottest* p/d games of '92! Includes Mother Lode, Moria, Minefield, Poing, Intruder Alert, Deluxe PacMan, Rocky and Super Artillery (see Dec. '92 AmigaWorld) Four disk set, counts as three.

FD81: SuperGames - Some of *the* best games--Donkey Kong is better than the original *with an extra level!* Frantic Freddie and TrailBlazer are both fast-paced arcade games. Mad Bomber is the classic game of "Kaboom" redone with an Amiga flare. All of these games are excellent!
FD82: Intrepid - In the Arctic ice, you control a tank on a mission to rescue hostages in this superbly crafted Amiga original.
FD84: Games! Deluxe PacMan is better than the original--20+ mazes, special "power-ups" with *oustanding* graphics. ThinkAmania is the classic game of concentration--with *beautifully* drawn HiRes images.

WORKBENCH DISKS

WB4:Telecommunication - This disk contains several excellent pd communication programs: Access 1.42, Comm 1.34 & Handshake 2.12a. See also WB102 & WB115.
WB5: Fonts #1- 35 bitmap fonts. Also included are five PageStream fonts,and ShowFont - a font display program.
WB6: Fonts #2 - ShowFont allows you to quickly and painlessly view all 256 characters in a typical font. Includes large AmigaDos system fonts (many up to 56pts).
WB7: Clip Art - This disk is loaded with black and white clip art. Art includes, trees, watches, tools, US and State maps, and more.
WB9: Icons - Truly a multitude of various types and kinds. Also includes IconMiester, IconLab, and others great utilities to help generate icons.
WB12: Disk Utilities - This great disk is loaded with wonderful utilities for everything including making disk labels, disk cataloging, disk optmizing, disk and file recovery archive and organizing, and all sorts of file manipulation. A must have!
WB13AB: Printer Drivers and Generator - over 70 different drivers (including HP LaserJet 3 & 4!), also includes a printer-driver generator. Two disk set counts as two.
WB15: Business - This disk contains a spreadsheet, a database, a project/time management program and financial analysis (stocks).
WB18: Word/Text Processors - This disk contains the best editors. Includes,TextPlus (v2.2e) a full featured word processor, Dme(v1.35) a great programmers editor with strong macro features,TexED(v2.8) an enhanced Emacs type editor, and a spell checker.
WB22: Fonts #3 - Several more great fonts. These, like the other font disks work great with Dpaint and WYSIWYG word processors.
WB23: Graphics and Plotting - Plot, a 3-D mathematical function plotter. Can plot any user defined function, BezSurf2 - produce awesome pictures of objects one could turn on a lathe. Can also map IFF image files onto any surface that it can draw. Now compatible with most 3D packages, and VScreen - makes a virtual screen anywhere.
WB25:Educational - On this disk are two programs that can generate maps of differing types, World Data Base uses the CIA's data base to generate detailed maps of any entered user global coordinates. Also Paradox a great demonstration of Albert Einstein General Theory of Relativity.
WB27: Nagel - 26 Patrick Nagel pictures of beautiful women.
WB33:Circuit Board Design - several terrific routines for the electronic enthusiast, Including PCBtool - a circuit board design tool, LogicLab - circuit logic tester, and Mcad (1.26) a well done new release of this PD CAD program, now comes with predrawn common circuit components for insertion into schematics.
WB35: 3D Graphics - This disk contains 3Fonts - Full vector font set for use with 3d programs, FontMaker - make 3d fonts from any system font, Make3DShape - create 3d shapes from any image, DumptoIFF - create 3d animations preserves pallet, World3d - a demo of a front end for use with DKBRender.
WB36: Graphics - On this disk are several programs to create stunning graphical images including, MPath - creates swirling galaxy images, Roses - produce an unlimited number of variations of images that a symmetrically similar to a rose, SimGen - display those spectacular images as part of your workbench, and RayShade - a very good raytracing program, create your own beautiful 3d graphic models with this one!
WB37: Educational - Educational games and puzzles that cover math, geography, spelling, and books. Ages 6 - 15
WB38: Plotting and Graphics - Plotxy is a powerful full featured plotting package. Used by many colleges and universities. Highly recommended. Plans - a incredibly well done Computer Aided Drafting program, very full featured. Tesselator - a program that helps generates fantastic looking, recursive M.C. Ecsher type pictures.
WB41: Music - MED an incredibly well done, full featured music editor. Create your own stunning music directly on your the Amiga. Similar to SoundTracker but better. Very powerful easy to use program. Version 3.20--compatible with WB2+.
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WB48: Clip Art - Hires clip art. Motifs - Holidays, music, medical, and misc.
WB50: Animation - Seven of the best euro-style animations or "Demos", including - scientific 451, subway, sunride, thrstdemo, tnight, waves, and woow.
WB53: Graphics - Raytracing programs generate absolutely stunning realistic looking planes, rockets, buildings..., and surreal images. C-Light is the most powerful EASY-TO-USE of it's kind we have seen to date. This is easily better, and more full featured, than similar commercial programs costing in the hundreds of dollars. Also, sMovie - a full featured video text titler similar to ProVideo, Broadcast Titler. Great video scrolling, wipes, special effects, and more...
WB54: Printing - This disk contains several routines to help with the chore of printing. Includes Gothic - Finally a Banner printer for the PD! PrintStudio -a well implemented all-purpose printer-utility with a very comfortable graphic interface and many advanced features, Lila - with ease, print ASCII files to a PostScript printer, and more.
WB55: Application - XCopyIII - a full featured disk copier, make backups of copy protected disks. RoadRoute - find the quickest route from one city to another, highway description included. Diary - a diary program like "Dougy Houser M.D", Cal - a calendar program, Magman - a database tailored for articles and publications.
WB57: Animation - This disk has several "Demo" style animations, Including, Blitter, Lolly, Sun5, vertigo, vortex, and xenomorph.
WB62: Midi Utilities - Several useful midi utilities including, programs to transfer to and from several music programs to midi, a midi sysex handler, a midi recorder with timebase, display midi info, file sequence player, and a few scores.
WB63: Disk Utilities #3 - Several highly recommended programs to aid in removing duplicate files from your hard drive, performing file backups, Binary editing, fast formatting, file recovery, and forced disk validation of corrupt disks.
WB66: Icons #2- Lot's of neat icons. Also, several wonderful programs that to let you create your own icons, modify and manipulate icons and info structures.
WB69: Music - 90 minutes of classical and modern electronic music for you Amiga.
WB75: Music - over 100 instruments files (.inst) and sample sound files (.ss)
WB79: Home & Business Accounting - Includes Ckbacct - the most complete checkbook accounting program going, LCDCalc - this well done calculator has a very large display and operates from the keyboard or mouse, Mileage master - monitor your automobile mileage with this mileage log, Grammar - a grammar checker, and Worldtime - find out what time it is in up to 50 global cities.

WB119ABCDE: Font Set This collection contains over 100 typefaces for use with Professional Page/PageSetter 3+ or PageStream 2.1+. These fonts will output to any laser printer or dot-matrix printer with no jaggies, thanks to outline fonts. Very pro-looking. *5 disk set, counts as 4.*

WB81: Great Applications - DataEasy a very easy to use, database program. Don't let the ease of use fool you, this is a very full featured database program including full printer control for address labels and mail merge applications. Also includes, TypeTut a good typing tutor, RLC a full featured label printer, Banner, a multi-font banner maker, and Budget a home accounting in a program. Highly recommended.
WB82: Animations - Four full length, well done "movie" style animations. Including, Coyote, JugglerII, GhostPool, & Mechanix. 2 disks, counts as 1.
WB93: Workbench 1.3 Extras #2 Contains the utilities that Commodore should have shipped with the Amiga; VirusX4.0, Snap, FixDisk (recover corrupt/deleted files), Disk Optimizer (floppy & hard), MachIII (screen blanker, hotkey, mouse accel., macro, clock utility), GOMF (a gurubuster)and PrintStudio.
WB95: Checkbook Accountant 2.1 - Definitely commercial grade; we've seen many checkbook programs and this is the best. Full budgeting, transaction recording & report generation.
WB96: Dupers - Contains XcopyIII & Nib which will backup copy-protected programs. FreeCopy removes copy protection from several programs, and SuperDuper will crank-out fast AmigaDOS copies.
WB99: Lifestyles - Includes AGene—family tree program that tracks up to 600 people/marriages/etc. Landscape is a CAD program to create gardens/landscapes. Loom simulates an 8 harness loom; experiment with pattern design with instant feedback.
WB102: Telecommunications - Contains the programs NComm 2.0 and VT100-29B. Zmodem protocols, XPR protocol support, full VT100 emulation. NComm's script language is so powerful it can create a full-featured BBS system.
WB106: Home Manager - This is a great all-in-one address book with an autodialer/notepad/to-do list/appointment scheduler/home inventory database and phone number dialer.
WB108: OctaMED - This breakthrough program doubles your Amiga's sound capabilities from 4 channels to an ear-popping 8 channels! All the renound editing capabilities of MED plus 4 more channels! If you thought your Amiga sounded good before...you aint heard nuthin' yet!
WB109: VerseWise - Display, search and print The New Testament.
WB113: Sid II - Why pay 40 bucks for a directory utility, when this one will do it all plus much more! A truly professional-caliber program. Sid 1 was our best, now *completely* rewritten, Sid 2 will astound you.
WB114: Fonts #4 - Contains 36 bitmap system fonts.
WB115: Telecommunication - If you have AmigaDOS 2.04+ and a modem, then this is *THE* program for you. Term *totally* conforms to the User Interface Style Guide for 2.04, has an ARexx port, and supports all popular file-transfer protocols through XPR libraries. We wish all programs were this good.
WB116: Databases - This is what you've been waiting for! Contains 5 uniquely specialized database programs for tracking: Videotapes, CD's, Magazine Articles, Comic Books and Trading Cards!
WB120: Grinder - a complete graphics conversion package that supports GIF's, JPeg, Neochrome, Degas, PCX, Targa, TIFF, HAM-E and IFF format pictures. An invaluable tool for all desktop-videographers and desktop publishers.

WB118: Amiga Beginner - *You asked for it!* A complete tutorial for the beginner on using the Amiga. Starts you off at the power-switch and takes you through to the CLI/Shell and all points in between. *Bonus!* Also included are 16-color icons to replace *every* icon in your 2.0+ Workbench.

WB121: ProPage3/4 Enhancer - This disk contains over 40 "Genies" for use with ProPage 3+, including useful ones like Make Pie Chart and Resize Text to fit Box to name a few. Also includes structured & bitmap clipart for unique borders...a *must have* for all PPage 3 users.
WB122: System Optimizer - KCommodity enhances your system, gives memory meters, mouse/keyboard enhancements, online timers plus *many* others...too numerous to list! REorg will optimize hard and floppy-disks for a big speed increase. HDMem will allow you to use up to 2 megs of hard-drive space for virtual memory! (Req. 68020+ w/MMU) All programs require 2.0+.
WB123AB: Flags of the World - same as WB124, but for Workbench 1.3. Req. 1MB. 2 disk set, counts as two.
WB124: Flags of the World - Two modes: click and learn or a game to test your knowledge. Great graphics--fantastic learning tool. Has current Russia & Yugoslavia republics. Req. Workbench 2.0+ & 1MB RAM.
WB127: Blankers - Over 20 different screen blankers. Most run on Workbench 1.3+...a few require 2.0+
WB128: ColorFonts - contains 12 color bitmap fonts for use with DPaint or any software that supports ColorFonts.
WB129: Super Virus Killer - From Safe Hex Int'l, who catalogs and kills Amiga Viruses *worldwide*--a complete virus system that knows all Amiga viruses...updated often. Req. WB 2+
WB130: ToolManger 2 - The ultimate tool manager for your Workbench. Add animated icons, sound effects and 'docks' of programs to your WB..very useful! Req. 2.0+ and hard drive.
WB131: Magic Workbench - Make your 2.04+ Workbench sizzle with style with these 8-color dithered icons. Easy auto-installs in minutes. Req.'s WB2.04+ and hard drive.
WB132: Canon Studio Version 2 - Special printer Preferences editor and drivers for BJC 600, 800 & 880, LBP, A1, A2, BJC 800, BJ 5, 10, 20, 200, 230, 300, 130.
WB133: Panasonic Studio - Special printer Preferences editor and driver system for all Panasonic 9 & 24-pin printers.
WB134: 3.0/AGA Blanker - BlitzBlanker for WB3.0+ 14 different blankers to really show off your AGA machine!

DEV DISKS

DD54: Compression - The best file compression programs and aids for the Amiga. Includes Arc, Lharc, Lhwarp, Pkax, PowerPacker a must have by all, Zip, Warp, and Zoo.
DD71AB: C Compiler - This disk contains DICE, Matthew Dillon's full featured, powerful C compiler & environment. 2 disks, counts as 2.
DD79abcd: Amiga "C" Tutorial - This is the most comprehensive C language--*Amiga oriented*--set of tutorials available. Includes full working examples, source code and an incredible set of lessons. Included are full discussions and examples for Amiga programming. 4 disk set, counts as 3.
DD86: The Programmer - Includes GadTools and REQTools which will allow you to create your own user interfaces and then the program will automatically generate "C" source code or Assembly-code. Requires, and writes code for, AmigaDOS2+.
DD89: UEdit - Probably the most powerful text editor for the Amiga. Previously commercial, now public domain. 1 MB.
DD91: ParBench - Allows you to easily connect/network two Amigas/CDTVs together and share storage devices. Req's custom cable (docs to make cable included--easy).
DD90: Advanced Utilities - CompressDisk doubles the capacity of your hard-drive on the fly with compression!!! Also contains: disk optimizer, SCSI mount utility, Keymap editors, Enforcer, Undeleter & more. Most programs require 2.0+.

VIDEO DISKS

VO9: Imaging - Included on this disk are the indispensible utilities, Rend24, ViewTek and the JPEG utilities. Rend24 is invaluable for 24-bit animators allowing for previews on AGA and non-AGA Amigas. ViewTek plays back anims of all sorts including Anim 5, 7 and 8 formats.

TURN THE PAGE AND SEE DEVWARE VIDEO FOR ORDER INFO, OR *ORDER TOLL-FREE (800) 879-0759!*

THE LAST WORD

Kudos, complaints, comments, concerns, and contributions from our readers.

For/Against Games

February's "Editor's Drawer" revealed what I have suspected for quite some time: Amiga owners primarily use their machines to play games. *AmigaWorld* should focus on its real (and neglected) market: gamers. Granted, most of us would welcome Microsoft Word or a new WordPerfect for the Amiga. It ain't going to happen, folks. And while it is obvious that the Amiga's video prowess far outstrips the competition, the time is ripe for *AmigaWorld* to pay more attention to its bread-and-butter customers.

Paul Thurrott
Scottsdale, Arizona

The Amiga, by the nature of its users and its strengths and weaknesses, is not going to take the same path as the PC. If CD32 helps get the Amiga name into buyers' heads, then I'm all for it. The Amiga can be marketed as both a video/multimedia creator's system *and* a home entertainment system without confusing buyers. Money from CD sales can go toward development of ever-more advanced Amigas.

Another overlooked use of the CD32 system is as a kiosk information system. For about $700, including the cost of the MPEG cartridge, you could build the start of a kiosk system like nothing on the market. Once again, CBM has given buyers state-of-the-art hardware at economy prices.

Zoltan Hunt
Downsview, Ontario

As a 13-year-old Amiga user, I'm offended by the principle of video game systems. Who would spend $139.95 on a game system and $70 to $85 per game? Not me! Not all teenagers are stuck on Nintendos. Since I was 5 years old (and a C-64 user), I've been loyal to Commodore.

Nathan Jones
Shirley, Massachusetts

I couldn't find any place that actually had the CD32 in stock, so how is Commodore supposed to compete with kings like Sega and Nintendo? They have no arcade hits and nothing outstanding compared to the 16-bit Sega CD. The system could be dead before it's released. Too bad, because they had a chance.

George Bain
Schumacher, Ontario

Get Back in Business

Where is the coverage on business programs, music, and the many other aspects of computers? True, the Amiga is at the top of the hill as far as video is concerned, but the Amiga is fully capable of more. People see the Amiga as just a video tool, something like a VCR. If we expect to attract some of the Mac and IBM users, *AmigaWorld* has to be a lot more diversified in its computer coverage.

Horace Gilchrist, Jr.
North Baldwin, New York

*A good magazine changes pace with the market it is covering, and **AW** seems to be doing just that.*

Net Update

I wish to correct some errors and omissions in your article "Cruisin' the Internet" (Jan. '94, p. 65).

1. The Internet is not based on Unix. All modern computers can hook up to the Internet. To connect your Amiga directly to a local area network, you'll need a networking card and the proper software to handle a TCP/IP connection *(see "Net Gains," Mar. '94, p. 33)*. Freely distributable software is available to connect to the Internet via modem, without a networking card.

2. When downloading a file via FTP, you should not type "get filename.lzh"; this can result in a corrupt archive. You may need to set your terminal software to "binary" mode first [on non-Unix systems]; consult your documentation.

3. FTP site amiga.physik.unizh.ch shut down months ago. In the US, use the following FTP sites: ftp.wustl.edu, ftp.cdrom.com, and ftp.etsu.edu. Switch to the directory "/pub/aminet." Other sites, such as ftp.hawaii.edu, carry the Fred Fish library.

Dan Zerkle
Davis, California

Thanks for the update, Dan. (Dan is the moderator of the Usenet newsgroup comp.sys.amiga.announce, and encourages readers to mail Amiga-related news to announce@cs.ucdavis.edu.)—Eds.

Your "Cruisin' the Internet" article was simple and basic (which the intimidating Internet is not), but covered much information that Amiga owners need to get started. I especially liked Cindy Field's and Tim Walsh's information on Amiga-specific files.

I invite all Amiga owners to inundate the Internet with impressive programming, graphics, animations, sound and music files, as well as news and views to force Mac, DOS, and Unix users to use Amiga resources.

Rick Rudge
Milwaukie, Oregon

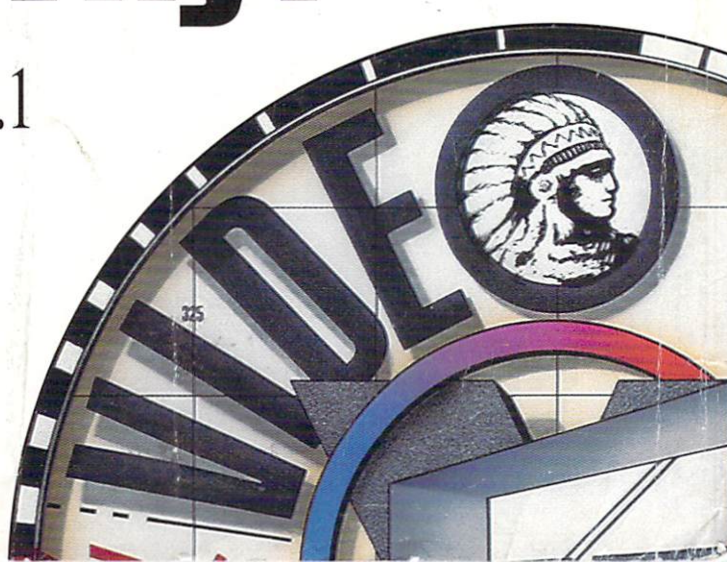
Improvement Noted

Your last two issues of *AmigaWorld* (Jan. & Feb.) have been your best two yet, with substantial improvements in both. A good magazine changes pace with the market it is covering, and *AW* seems to be doing just that.

Todd Putnam
Travis AFB, California ■


A4000
AGA


NEW UPGRADE
VIDEO TOASTER
3.1


VIDEO
325